THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LVII. No. 1454.] LONDON, MARCH 24, 1891. [43RD YEAR. Price 6d.

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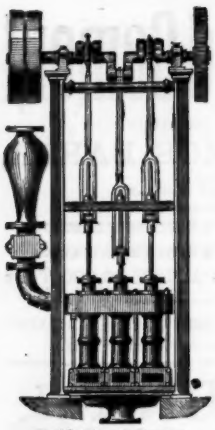

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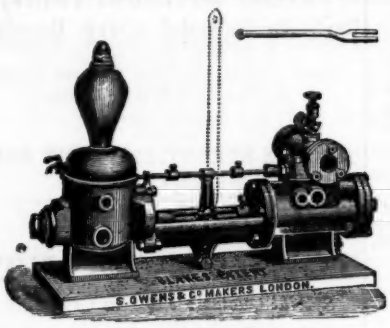

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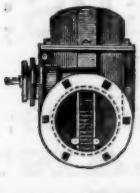

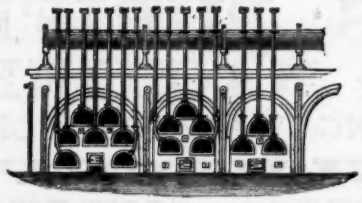

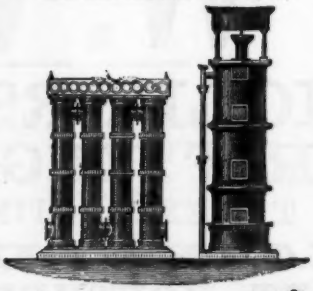

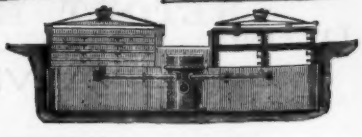

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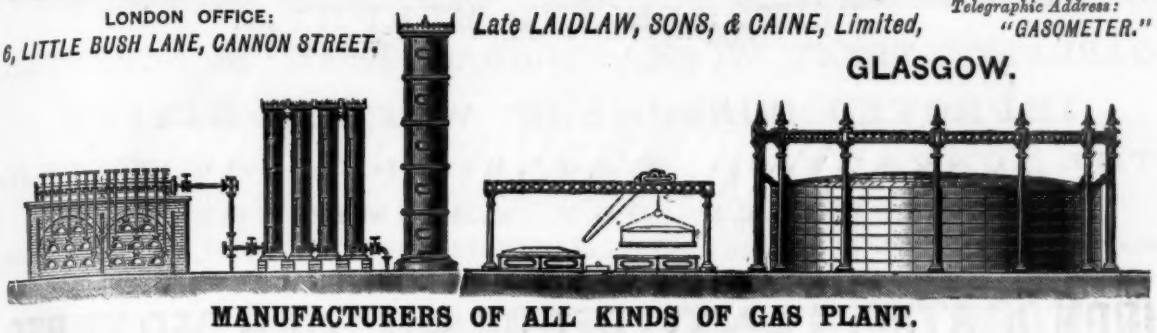

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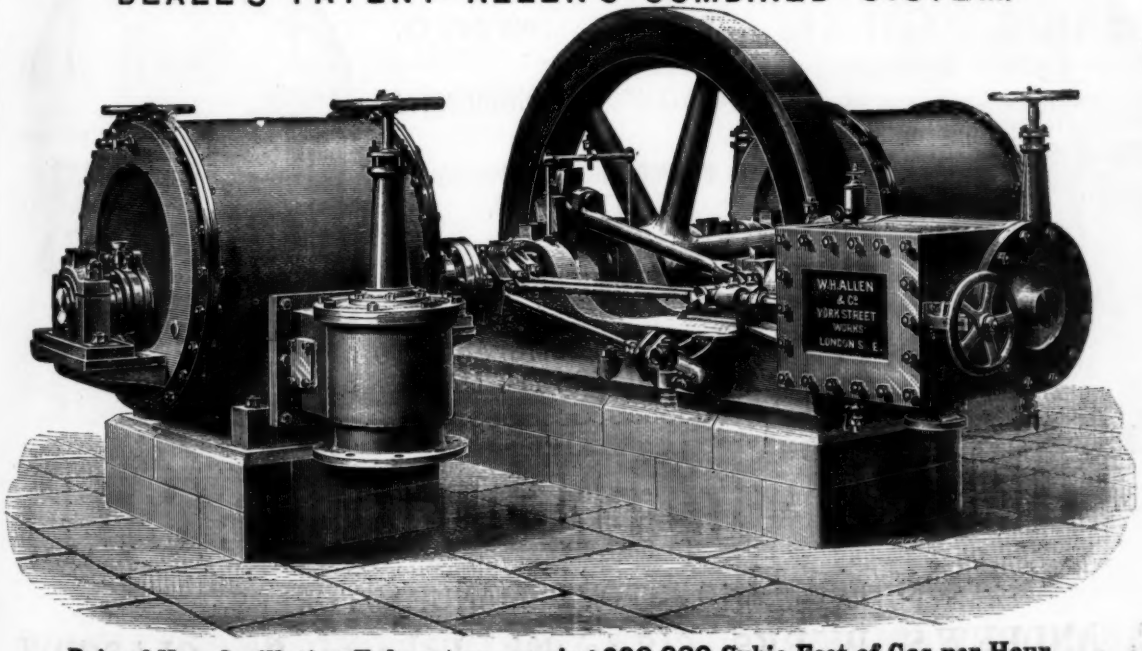

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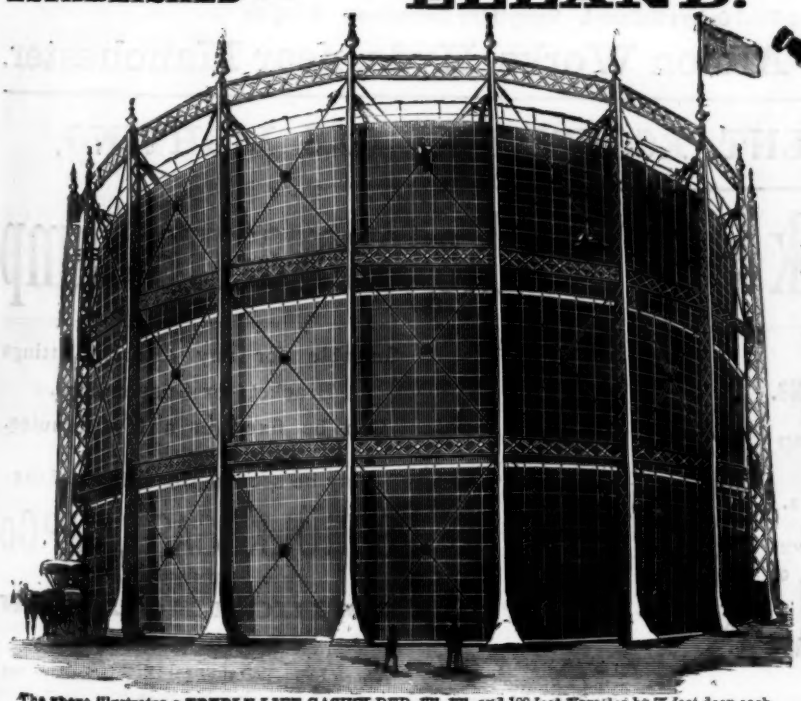

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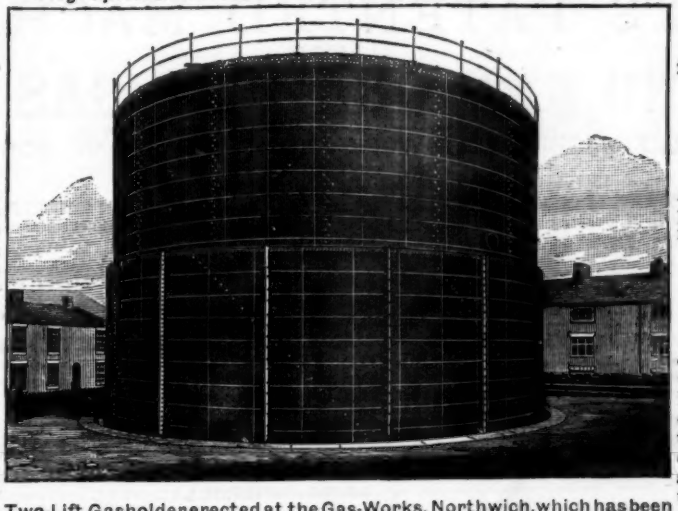

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The plan adapts itself to telescoping to any reasonable extent, and enables very shallow holders or lifts to be employed with perfect stability.

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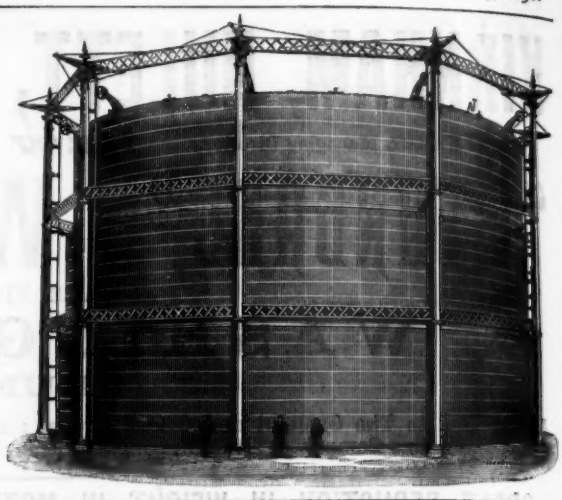

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OVER **180** MACHINES AT WORK AND IN COURSE OF CONSTRUCTION.

Advantages attending its use are:

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POWER CHARGING AND DRAWING MACHINES, driven by COMPRESSED AIR, STEAM, or ROPE. The power machines are applicable to circular, oval, or Ω-shaped retorts and mouthpieces, and are the most perfect, economical, efficient, and durable machines made. They are constructed on principles founded by long and extensive experience in this special branch of gas engineering and the manufacture of gas.

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Sole Makers of CIRCULAR, OVAL, or Ω-shaped MOUTHPIECES with Morton's Self-Sealing Lids, fitted with

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secure a very tight joint; and at the same time the eccentric motion given to the Lid effectually removes the Tar from the surfaces of the Joint.

N.B.—The whole of these Fittings are made of Wrought Iron. Several Thousands in use.

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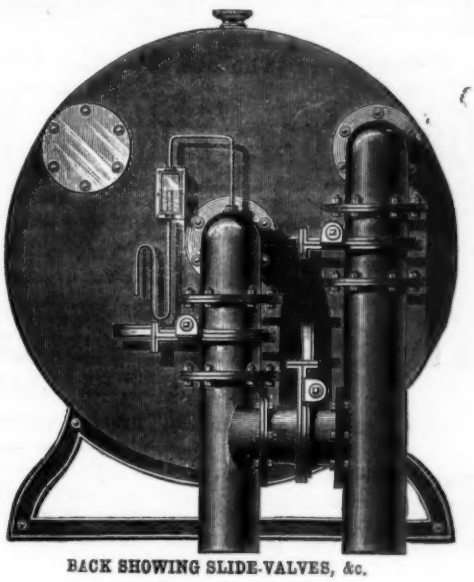
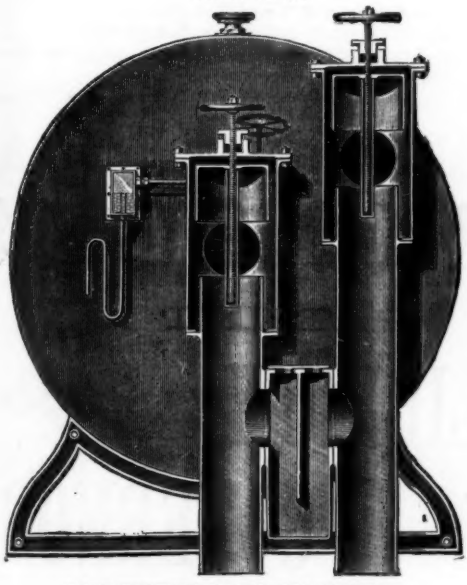


BACK SHOWING SLIDE-VALVES, &c.



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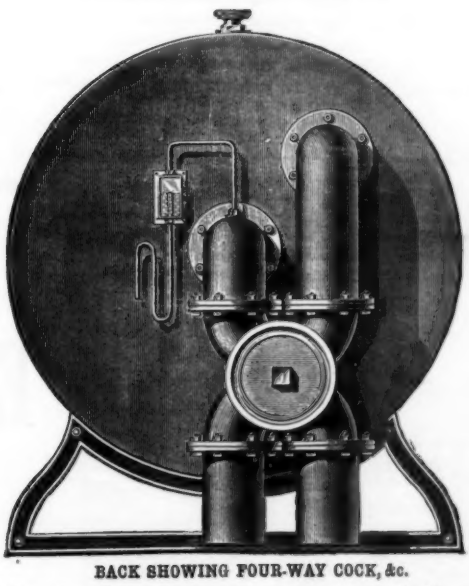

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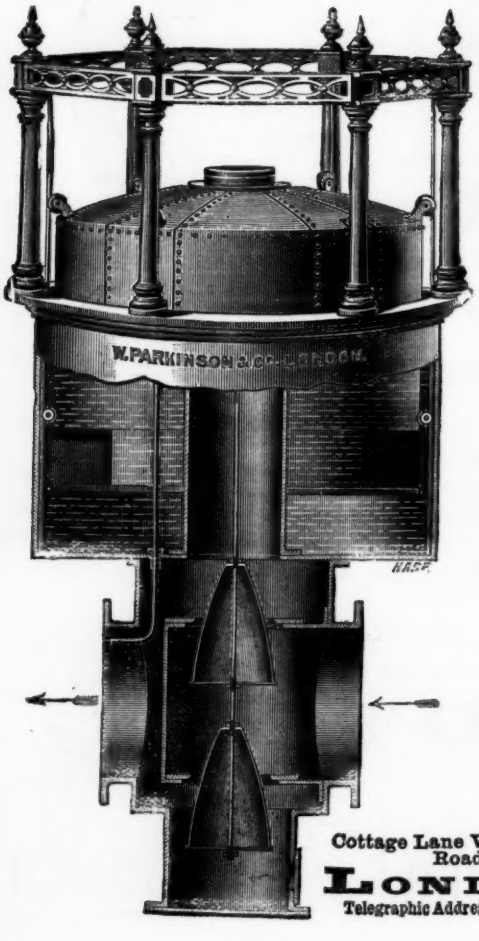

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[See also Advt. p. 576.

CONTENTS.

EDITORIAL NOTES:—

GAS, LIGHTING, &c.— PAGE

Reaction after Excessive Gas Consumption . . . 539
The Eastern Counties Meeting—Wet *v.* Dry Meters . . . 540
The Strike of Parliamentary Counsel . . . 540
The Limitation of Parliament . . . 541

WATER AND SANITARY AFFAIRS—

The Committee on the Metropolitan Water Bills . . . 541
The London County Council and the Water Supply—A New Bill . . . 542

ESSAYS, COMMENTARIES, AND REVIEWS:—

Gas and Water Companies in the Stock Market . . . 542
Electric Lighting Memoranda . . . 542
Inquiries and Inquirers . . . 543

NOTES:—

Bidwell's Selenium Photometer . . . 544
A Mechanical Comparative Photometer . . . 544
The Sulzer Engines . . . 544

TECHNICAL RECORD:—

Eastern Counties Gas Managers' Association—Half-Yearly Meeting at Lincoln—General Business; President's (Mr. J. Carter's) Inaugural Address . . . 545
Midland Association of Gas Managers—The Fourteenth Annual Meeting . 548
South-West of England District Association of Gas Managers—The "Official Report" of the Twenty-Seventh Half-Yearly Meeting . . . 550

REGISTER OF PATENTS:—

The Construction of, and Apparatus for, Charging Inclined Gas-Retorts—Hunt, C. . . . 552
Gas-Engines—Baxter, S. (Holst, L. J. R.) . . . 553
Charging and Discharging Gas-Retorts—Woodhouse, S. J. . . . 554
Cooling and Conveying away Coke Discharged from Gas-Retorts—Waller, G. . . . 554
Gas Motor Engines—Otto, N. A. . . . 554
Gas-Engines—Bickerton, H. N. . . . 555
Patent Notices . . . 555

CORRESPONDENCE:—

Rating Committees and "Tenant's Working Capital" . . . 555
Recent Appeals to the Chief Gas Examiner . . . 555
The Oil Lighting Experiment at Erith . . . 555
Mr. Dexter's Paper at the South-West Meeting . . . 556

PARLIAMENTARY INTELLIGENCE:—

House of Lords—Progress of Bills . . . 556
House of Commons—The Quality of the London Water Supply in February; The Committee on the Metropolitan Water Bills; The Metropolitan Water Supply Inquiry; The London County Council and Water Supply; Progress of Bills . . . 556

LEGAL INTELLIGENCE:—

County of London Assessment Sessions—The Assessment of the Crystal Palace District Gas Company's Works . . . 557
Bolton County Court—The Allowance of Discount to Gas Consumers . . 558

MISCELLANEOUS:—

Metropolis Gas Supply—Recent Appeals to the Chief Gas Examiner . . . 558
The Rating of the South Metropolitan Gas Company's Works . . . 559
Ammonia Gas Purifying and Alkali Company, Limited . . . 559
Stafford Corporation Gas Supply—Proposed Extension of the Works . . . 560
The Great Grimsby Corporation and the Gas Company—A Proposal to make a Road across the Gas-Works . . . 560
Colonial Gas Undertakings . . . 561
Metropolis Water Supply—The Quality of the Water in February . . . 562
Notes from Scotland . . . 562
Current Sales of Gas Products . . . 563
Gas and Water Companies' Stock and Share List. . . . 565

PARAGRAPHS.—Visit of Mr. T. J. Bush to England, 541—Boring for Natural Gas on Teesside, 542—Mr. G. Ernest Stevenson, M. Inst. C.E., 543—Sir F. Abel, 544—Death of Mrs. Garnett, 544—New York Water Supply, 547—New Joint-Stock Companies, 555—Scraping a Water-Main at Newport (Mon.), 555—The Shipment of Creosote Oil to America, 556—The Water Supply of Stainland, 556—Electric Lighting for Portsmouth, 556—The Leighton Buzzard Gas Company's Bill, 559—The Gas Supply to Oldham Out-Townships, 559—The Extensions at the Elland Gas-Works, 561—Sequel to the Halifax Gas Scandal, 561—Northern Coal Trade, 562—Gas Exhibition and Cookery Lectures at Broadstairs, 562—Extensions at the Westhoughton Gas-Works, 563—Richmond (Surrey) Water Supply, 563—Sales of Shares, 564—Cheap Gas and Pure Air for Manchester, 564—The Leeds Gas Committee and their Men, 564—Increased Gasholder Capacity at the Lymm Gas-Works, 564—The Public Lighting of Newcastle, 564—Lancashire Coal Trade 564—Bristol Water Company, 564—Tampering with a Gas-Meter, 564—New Pumping Engines for the Cambridge Water Company, 564—The Bramley and District Gas and Water Scheme, 564—Anglo-Romano Gas Company, 565—Claim for Damage to Electric Lighting Poles and Wires in New York, 565—Long Eaton Water Supply, 565—Bangor (Co. Down) Water Supply, 565—The Gas Supply of Philadelphia, 565—Windsor Corporation Water Supply, 565—The Matlock Local Authorities and the Gas Company's Order, 565—Tynemouth Gas Company, 565—The Price of Gas at Heckmondwike and Liversedge, 565—Improved Position of the Huddersfield Corporation Water Undertaking, 565—The Rateability of Turf-Covered Reservoirs, 565.

TO CORRESPONDENTS.

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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 24, 1891.

Reaction after Excessive Gas Consumption.

It is an ill wind that blows nobody any good; and the cold easterly winds that set in after the mildness and preternatural dryness of February brought some comfort to gas managers suffering under the sharp reaction from the winter's extraordinary demands. Prudent men of business dislike what our American friends call "booms" in their trade. There was a most phenomenal "boom" in gas last winter, as the accounts for the last quarter of the year amply testify. But a sharp rise of rental means also heavy consumers' bills; and all over that part of England which suffered most severely from the inclemency of the past season, the Christmas gas accounts have been exceptionally heavy. We have not heard of anything that might be dignified by the name of an "agitation" against the gas bills, because it has so happened that they were delivered while the frost still held; and householders could not deny that they had burnt a good deal of gas to help keep out the cold and combat the fogs. All the same, the bills frightened them in a good many instances; causing them to register a resolution to cut down the gas consumption as soon as the weather permitted. Consequently, when the extreme severity and gloom gave way to a period of as exceptional brightness and dryness, the consumption of gas received a sudden check. Retort-stacks which could hardly produce gas fast enough about a week earlier, had to stand off with marked suddenness; so that managers were compelled to prepare for letting down the fires for the spring a very few days, as it seemed in many places, after they had been working "hard all" to keep the gas-holders afloat. We believe we are justified in stating that in some districts the gas consumption of the past month fell markedly below that of February last year; and if the weather had not set in cold and gloomy again when March was a few days old, the current quarter would have shown very queerly in the accounts, as compared with that which preceded it.

The attitude of the prudent gas administrator to his customers with reference to their accounts is a matter of considerable importance, especially during such seasons as that which has just been experienced. A shallow-pated man, of the kind of those who think themselves wondrous clever, chuckles over the complaint of heavy gas bills, which he fancies must mean "good business" for the concern; but he is greatly mistaken. The cunning that discourages the fixing of a separate meter to a cooking-stove, and foists off extravagant gas "fires" upon unsuspecting consumers, is the worst kind of foolishness with which a gas official can be cursed. It is an old caution that consumers should be instructed to use only the most economical gas appliances; but the principle is still completely unknown to many an officer, and is scarcely sufficiently acted upon anywhere. The truth about gas cooking-stoves is hardly ever told; and the necessity for care in their use, if they are not to be discredited as too expensive luxuries, is seldom emphasized forcibly enough. With gas "fires" and heating-stoves generally the case is even stronger. While the heedless consumer flares away the gas in one of these arrangements, the vigilant meter is steadily scoring against him in the cellar; and when the bill comes in, there is a great outcry. We entertain the idea (which may be a mistaken one) that if the statistics of the use of gas-fires in any sufficiently large and representative district could be obtained, they would prove anything but complimentary to these devices. We occasionally hear from chairmen of gas companies statements of the number of gas-fires sold during a given period; but we are never told anything about the number of these appliances that are thrown out after longer or shorter experience of their use.

The fact is that there is a constant pressure upon householders, which pressure increases year by year, to reduce house-work to its simplest expression, in consequence of the great and growing difficulty of procuring domestic servants. In the very large lower middle class, whose members use more gas in their houses, in proportion, than any other order of the community, and whose household work is done with the aid of one, or at most two servants, it is an object of ever-present solicitude to so dispose the household arrangements that, upon the occasion (which may occur at any moment) of the mistress being left without help, the necessary duties may be performed with the least possible amount of labour and dirt. The cooking and the fires always bulk largely in the contemplation of housewives who may have to do everything for themselves, and perhaps in the depth of winter, for days and weeks together, in consequence of the vagaries of a domestic servant. When gas cooking and gas firing are brought under the notice of these much-worried ladies, they are naturally regarded with favour, mixed perhaps with a little misgiving. A lesson or two in gas cookery dispels

this; and the gas-kitchener is taken to kindly enough. Prudently managed, it is not too expensive to outweigh its convenience. Its chief rival is the so-called American coal-range, which is by no means to be despised.

The gas-fire is adopted principally for the same reason that recommends the cooking-range—the saving of labour, which is even more conspicuous in its case. In the average middle-class house, besides the one or two living-rooms in constant use, there is at least one "public" room, as the expressive Scotch phrase goes, besides bedrooms and nurseries, where a quick and clean means of warming is desirable. For this purpose the gas-fire is tried, either in the form of the grate filled with fire-clay lumps, &c., made hot by an atmospheric burner, or by one of the multitudinous patterns of "radiant" gas-fires devised for hanging upon the front of the grate or standing in the fireplace. Except for halls and offices, it may be said that there is at the present time no sale for any other description of gas heating-stoves than the kind just mentioned. They have the advantage of being cheap, and they are now-a-days very nattily got up; but they one and all take a good deal of gas for the effect produced. It is idle to deny the fact. For tiny rooms, used as "dens," workrooms, &c., a small gas-fire is sufficient, and makes little difference on the gas bill for the house; but for anything more important, it is short-sighted policy for a gas manager to allow a consumer, if he can help it, to rely upon gas heating without a clear understanding of what it is likely to cost him. The stove maker has to sell his stoves; but the gas manager has to sell his gas, and he must bear in mind the fact that the consumer, being human, if once disgusted with a gas heating-stove, will be quite likely to reduce his consumption of gas for lighting. The banishment of the gas-fire from the drawing-room grate will possibly synchronize with the appearance of the petroleum-lamp on the drawing-room table.

It may be said that the drift of these remarks is to depreciate the gas-stove, and more especially the gas-fire. But this is not so in reality; and, besides, anything we might say in the opposite sense will be powerless to affect the action of a single gas consumer who finds his bill too heavy. What we particularly desire to emphasize just now is the fact that the circumstances of middle-class housekeeping, more especially in regard to the great "servant question," are making powerfully in favour of the extended use of gas for cooking and firing. It is not so much a question whether householders like gas cooking and heating, but whether they can by any means do without it for these purposes. But we do not admit that advocacy of gas as the best and cleanest fuel for household purposes necessarily implies endorsement of any or all the apparatus that makers choose to put forward for its utilization. We contend that if a prudent gas manager saw one of his customers upon the point of using gas ignorantly, wastefully, or for an unsuitable purpose, and at a rate which he could not be reasonably supposed to be willing to afford, it would be that manager's duty to make proper representations in the matter, instead of watching it all with the thought that there would be at the end of the quarter a swingeing bill, which the consumer would be obliged to pay whether he liked it or not. Householders must come to employ gas more and more; the point is that they should not be choked off by being deceived in respect of the cost of using gas appliances of any kind.

The Eastern Counties Meeting—Wet v. Dry Meters.

THE members of the Eastern Counties Gas Managers' Association held a most successful meeting at Lincoln on Thursday last, under the presidency of Mr. John Carter, of that city, who had the pleasure of receiving a large party of visitors, for whom he had prepared a fitting welcome. The Corporation, who own the gas undertaking, were represented at the meeting by the Mayor (Mr. E. Pratt) and Mr. W. T. Page, Chairman of the Gas Committee; the presence of the civic dignitaries being a graceful testimony to the esteem in which Mr. Carter is held in the fine old city which he serves so well. This is evidently one of the places where the Local Authority and their Gas Manager are thoroughly satisfied with each other. Mr. Carter's Inaugural Address will be found in another column. It ranges over a number of topics; perhaps the most original portion being the last paragraph, in which the opinion, based on local experience, is given, that no exceptional measures are necessary for extending the consumption of gas among cottagers and the general class of small householders. Mr. Carter declares that, after having dealings with "thousands" of such consumers, he finds the risk no greater with them than with other classes. Possibly Mr. T. Banbury Ball, of Rochdale, could say the same; but the curious fact remains that, whereas in some localities the small householders have taken very well to gas, in others they have always done without it. The sole object of the special arrangements that were mentioned somewhat slightingly by Mr. Carter is to assimilate the latter to the former. Nobody would wantonly force them on a community where they did not happen to be required. The other business of the meeting included the reading and discussion of a paper by Mr. W. Barratt, of Grantham, upon the eternal rivalry of dry and wet gas-meters. It is hopeless to think of contributing anything new towards the settlement of a question that, to all seeming, will never grow nearer a conclusion than it is to-day. We all know that the wet meter is more defensible by philosophical argument than the dry meter; but this does not prevent consumers from making themselves offensive when their wet meters freeze, or there is any other trouble with the water. If we were to attempt to sum up the controversy by saying that if the wet meter is more accurate, the dry meter is more convenient, we should in all probability draw down an avalanche of reproof from strong partisans of both sides. So we will even let the matter rest where it is, with the single reflection that, whether wet or dry, the gas-meter is a triumph of modern skill and careful workmanship, and is the very best and most reliable measuring instrument for commercial purposes that the wit of man has yet conceived or his hands fashioned. And when it is remembered, in addition, that the meter is as remarkable for cheapness as it is for delicacy of adjustment and durability in wear, the character of the apparatus is still more strongly recommended to our admiration. Humorists—mainly American, and of the type that finds inexhaustible entertainment in joking about the size of the shoes worn by the ladies of Chicago—pretend that the gas-meter is, to put it mildly, not always a reliable instrument. We should much like to arrest the author of one of these American meter stories, and shut him up in a small room, without refreshment, while half-a-dozen gentlemen of our acquaintance in the meter trade took turns at talking the reprobate into a better frame of mind. He would then joke no more.

The Strike of Parliamentary Counsel.

A CONSIDERABLE amount of interest has been excited by the "strike" of counsel practising at the Parliamentary Bar, in regard to the ruling of Mr. Hanbury mentioned in these columns last week. As we remarked at the time, this ruling was not unprecedented, but merely revived an even more stringent resolution passed in 1861 by the General Committee on Railway and Canal Bills. This resolution was "that counsel shall not cross-examine a "witness unless he has been present during the entire exa- "mination-in-chief, and that counsel shall not re-examine "unless he has been present during the entire cross- "examination." This is actually the rule on the subject in the journals of the House; and it is quoted as official by Sir Erskine May. It has undoubtedly, however, been allowed to fall into desuetude. The ranks of the Parliamentary Counsel have been terribly fluttered by the revival of this restriction upon their manner of doing business. They have met in conclave, with the Attorney-General in attendance, and adopted a formal declaration that the rights of parties would suffer if Mr. Hanbury's ruling were maintained. Of course, they said nothing about the interest of leading counsel in the matter, and did not refer to the resolution of 1861. Their strongest point is the one mentioned in the JOURNAL last week—that as the evidence-in-chief may not bear directly upon the points which it is the duty of the cross-examining counsel to elicit, it is sheer pedantry to say that every cross-examiner must hear the whole of the evidence-in-chief. We recognized the force of this argument in the very case in connection with which the difficulty arose—the opposition by The Gaslight and Coke Company to the extension of the City and South London Railway. The views of counsel were communicated by Mr. Pope, Q.C., to Mr. Hanbury, who replied in a fashion that does not leave the honours of the controversy with the lawyers. Mr. Pope pretended to champion the

rights of parties; but Mr. Hanbury replied that his Committee "fail to understand how the interest of suitors "is fully consulted if their principal advocate, or, as "happened on Friday, both their advocates, are engaged "elsewhere upon other business (possibly in three or four "different cases), if their counsel do not attend to hear "the evidence of their opponents, or if their leading "counsel is absent during the greater portion of their own "case." The legal gentlemen allowed judgment to go by default in this matter. Meanwhile, it is rather to be deplored that the rejection of the particular Bill over which the dispute arose, and the consequent termination of the labours of Mr. Hanbury's Committee, prevents the question being raised in the House. Public, as distinguished from legal opinion is decidedly in favour of Mr. Hanbury; and since Mr. Pope came off so badly in his contest with him, it is not to be expected that the lawyers in the House will care to stir up the question. Thus one more strike may be regarded as a failure.

The Limitation of Parliament.

SPEAKING the other day at the dinner of the Associated Chambers of Commerce, the Marquis of Salisbury said some very wise and witty things about the clamouring for a legislative eight-hour day, which arose at the time when eight-hour shifts were conceded to gas workers in so many places. This alteration was effected with such apparent ease, that some hare-brained people at once jumped to the conclusion that it only needs an Act of Parliament to cut down the length of the working day to eight hours in all employments. How foolish this notion is, has been shown over and over again; but Lord Salisbury put the matter in a nutshell the other evening, and his words are worthy of being repeated, because they have a wider application than the subject which called them forth. They amount to a summary of the general objections to parliamentary interference in matters that had better be left to the working of natural and social forces. "Parliament," said Lord Salisbury, "uses such "grand language in its enactments, that it has got to "believe itself omnipotent; but that is a very great mis-"take. Parliament is a potent engine; and its enact-"ments almost always do something. But they very "seldom do what the originators of these enactments "meant. The result, to use a technical phrase, is the "resultant of a composition of two forces; and the two "forces are the enacting force of Parliament, and the "evading force of the individual. If the enactment "squares with the public interest, and is agreeable to the "public conscience, it will be carried out; if it has been "adopted as the result of agitation or at the bidding of "a class, if it overrides the rights of minorities, and "tramples on principles which the conscience of the "nation approves, that Act of Parliament will have no "effect in obtaining the objects for which it was made." It is a pity that not only eight-hour-day clamourers, but also smoke-abatement enthusiasts, and all the host of hasty folk who think that Parliament ought to enact this, that, and the other statute forbidding people to do what they cannot help doing, and ordering them to do what nobody can teach them how to manage, do not take these words to heart. Lord Salisbury often says clever things; but his reference to "the resultant of the enacting "force of Parliament and the evading force of the indi-"vidual," was masterly, as well as happily expressed.

Visit of Mr. T. J. Bush to England.—Among the passengers by the P. and O. steamer *Victoria*, from Sydney, which reached Brindisi last Friday, and the mails from which were delivered in London yesterday, was Mr. T. J. Bush, Engineer of the Australian Gaslight Company, who is away on six months' leave of absence. Our readers may remember that Mr. Bush (who is brother of the Secretary of the South Metropolitan Gas Company) about twelve years ago resigned the appointment he held under The Gaslight and Coke Company at Beckton, to take the management of the Australian Gas Company's works, of which he has since had sole control. Under his direction, the Company's operations have been almost quadrupled; not the least among his engineering achievements being the designing of the extensive station at Mortlake, and the supervision of the erection of the large gasholder constructed by Messrs. C. and W. Walker, and described and illustrated in the JOURNAL about two years ago. Some particulars as to the working of the Company in the half year ending Dec. 31 last, and the efforts they are making to extend the use of gas, will be found in another column.

WATER AND SANITARY AFFAIRS.

THE promised "strong Committee" to which all the Metropolitan Water Bills are to be referred, has been appointed; but its constitution does not appear very imposing. Sir Matthew White Ridley, we presume, will be Chairman. He has a reputation for ability, and is likely to be useful in directing the proceedings of the Committee. His parliamentary career includes service at the Home Office, the War Office, and the Treasury; and twenty years have elapsed since he entered the House of Commons. But we rather looked for a Chairman of greater renown. Sir Henry Roscoe has a place on the Committee, and takes rank as an expert, with a special knowledge of chemistry. But the chemical character of the London Water Supply is well understood by this time, and is of so unobjectionable a nature that those who wish to find fault with the water profess to consider the chemical test insufficient. Sir Algernon Borthwick, who also appears on the list, is identified with one of the Bills he will have to consider. Mr. J. W. Lowther, as representing one of the Cumberland constituencies, may be expected to keep a watchful eye over the Lakes. His business qualifications are indicated by the fact that he is a Railway Director. Mr. Rowntree, member for Scarborough, is a Solicitor. Mr. T. H. Bolton, of North St. Pancras, took part in the meetings of the Vestry delegates on the subject of the Metropolitan Water Supply last autumn, and joined the deputation to Mr. Ritchie on that subject. His remarks at the meetings and before Mr. Ritchie were more especially directed to the quinquennial valuation, as tending to raise the income of the Water Companies. His name also appears on the back of Mr. Causton's Bill. In conference with the delegates, while dwelling on the urgency of the valuation question, Mr. Bolton at the same time advised the Vestries to promote a Bill on the subject of the water supply, seeing that the County Council did not possess any powers for that purpose. Another member of the Committee is Mr. Bristowe, representing the Norwood division of Lambeth. In this instance, we have a man of City experience, and one who has served on the Committee of the Stock Exchange. St. Pancras has a second member on the Committee, in the person of Mr. H. L. W. Lawson, who represents the West borough. Having a residence at Taplow, in Buckinghamshire, Mr. Lawson may have been selected as being interested in the sources of water supply situated in the valley of the Upper Thames. But he has further qualifications as a Progressive member of the London County Council. Mr. Murdoch, the member for Reading, who, like Mr. Lowther, is a Railway Director, may guard the Committee against an apprehended design to "tap the Berkshire downs." So far, the County Councils up the river may be congratulated on having a voice in the deliberations of the Committee. Sir M. W. Ridley, Sir H. Roscoe, Mr. J. W. Lowther, and Mr. Rowntree were nominated by the Committee of Selection; the remaining five by the House. When Mr. Ritchie moved the appointment of the five, Sir John Lubbock expressed regret that, as the names had only appeared on the paper that morning, he had not had an opportunity of consulting with his colleagues on the County Council concerning the composition of the Committee. But he would not oppose the motion, nor suggest a change of names; and he had no doubt that the member for West St. Pancras "would most ably represent the views of the "London County Council." Concerning the names that were specified in Mr. Ritchie's motion, we may presume that the Chairman of the London County Council was not quite satisfied. Perhaps the *personnel* of the Committee will not quite satisfy anybody. The subject to be dealt with is one of great magnitude and intricacy, and demands for its elucidation an ability equal to that bestowed on some questions held to be of State importance. Mr. Ritchie has himself remarked that the Bills awaiting consideration by the Committee are "of enormous "importance."

Following the appointment of members on the Committee on Wednesday, another surprise awaited Sir John Lubbock, in the shape of the "instruction" moved by Mr. Ritchie on Friday. Sir John complained of the rapidity with which action followed notice in each instance. On such important questions, he thought more time should be allowed for consideration. Mr. Ritchie pleaded, in reply, that everything was right, and there

had been no undue haste. After some discussion, the instruction was agreed to by the House. The terms are such as give the most ample power to the Committee for the investigation of the subject to which the Metropolitan Water Bills relate. The Committee are authorized to inquire "into all matters" connected with the nature, price, management, sources, and sufficiency of the water supply of London and its suburbs; and they are to insert in the Bills such provisions in connection with these points "as in their judgment are expedient." Sir J. Lubbock asked one very necessary question—viz., whether, under the instruction as framed, the Committee would be able to inquire into the efficiency, condition, and "value" of the works. It seems to us that the instruction rather fell short on the question of "value;" the "price" referred to being obviously the mere "charge" to the consumer. Sir J. Lubbock's query likewise failed to comprehend all that was needful. The undertakings of the Water Companies comprise more than the mere "works." When the "efficiency" of these is fully and satisfactorily proved, and their "condition" is found to be perfectly good, a very material element of value, to which we referred at some length last week, remains to be considered. The theory of the London County Council is that they are simply going to buy sundry "water-works," and not certain "undertakings." The distinction is vital. Mr. Ritchie's reply to Sir J. Lubbock's inquiry was unfortunately on the same lines as the interrogation. Mr. Ritchie said he felt sure that, as the water supply depended to a very considerable degree on "the state of the works," the matter which Sir John wished to have inquired into would come before the Committee. Altogether, we feel that the question of purchase remains involved in much obscurity. But it cannot remain so to the end, despite the finesse with which the subject is now treated. Another matter with which Mr. Ritchie had to deal in moving the instruction, was that of the Metropolis Water Charges Bill; Mr. Causton urging that this should be the first measure for the consideration of the Committee—the House having already "adopted the principle" of the Bill. Mr. Ritchie reminded the over-sanguine member that the second reading of the Bill was carried with a distinct understanding that the House was not thereby committed to the principle. Moreover, it was quite impossible for a Bill to be passed into law before the 6th of April, when the new valuation would come into force. Mr. Causton must therefore wait the course of events.

At the same sitting at which the instruction was carried, Sir John Lubbock introduced a Bill to enable the London County Council to initiate legislation with reference to the supply of water. In this matter, Sir John is taking action at the request of the Council; and the Bill will be referred in due course to the Hybrid Committee, presuming it is able to escape overthrow at the hands of Mr. Boulnois, who has given notice of an amendment on the motion for the second reading, now fixed for April 8, that the Bill be read a second time that day six months. Concerning the County Council, there is the prospect, as announced by Mr. Ritchie, that the elections for all the County Councils will undergo postponement. A Bill for this purpose will be introduced, making the day of election Jan. 15, instead of Nov. 1. Should there be any great change in the composition of the London County Council, the circumstance may interfere with their parliamentary schemes for 1892. A question suggests itself, whether members of the County Councils in London and elsewhere, who may wish to retire, can be compelled to serve through the additional period.

Boring for Natural Gas on Teesside.—An experimental boring which the Newcastle Chemical Company have been prosecuting by means of an American process at Port Clarence has now reached a depth of 800 feet below the salt, or 1600 feet in all. It has passed through a bed of shale which gave off small feeders of gas and traces of oil; but operations have now been suspended owing to striking a strong feeder of water.

Mr. G. Ernest Stevenson, M. Inst. C.E., who, as many of our readers may remember, has for the past few years been residing in Buenos Ayres, has returned to England. Mr. Stevenson resigned his appointment at Peterborough to become Engineer of the Buenos Ayres (New) Gas Company—a position which he relinquished in order to devote more time to private practice. Subsequently his services were secured by the newly-formed Co-operative Gas Company of Buenos Ayres, for whom he designed and carried out entirely new works, which were described in the JOURNAL for Nov. 4 last (p. 955).

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 565.)

THE Stock Market, as a rule, has not improved its position much during the past week. It opened fairly well, and held out some little prospect of a brighter tendency. Scarcely any appreciable advance, however, was effected; and towards the end there was a disposition in prices to give way for lack of support—business on Saturday being limited in the extreme, owing to the counter-attractions of the boat-race. The chief events which influenced the markets have been somewhat conflicting. On the one hand, the passing of the Buenos Ayres provincial coupons of 1882 and 1886 was a lightning flash from a stormy quarter of the financial horizon; on the other, the confidence evinced by the successful conversion of the Murrieta house into a limited liability company, and the improved prospects of Uruguay, had a favourable action. Extreme caution in operating is still the rule. The Money Market continues easy. The Gas Department has been fairly active; transactions in the two larger Metropolitan Companies being conspicuous. As a general rule, the tendency has been upward; and all variations in quotation have been for the better, with the single (but important) exception of Gaslight "A," which has receded 2. Opening at a little better than 240, it rose to 242—the best of the week. From this point, it fell gradually away; and the closing mark was 238½. Numerous transactions were effected in the debenture and preference stocks, which maintained their position firmly; the 10 per cents. having perhaps a little the best of it. South Metropolitan "B" and debenture stock were active—especially the former. An advance of 2 each was registered in the quotations of "B" and "C." It may be noted that the two 13 per cent. paying Metropolitan stocks, Gaslight "A" and South Metropolitan "C," are now "neck and neck" in the market. Commercial old has advanced 2 more, and now stands level with the new stock. There have been no dealings; stock apparently being scarce. Hardly any business has been done in the Suburban and Provincial class; but Crystal Palace has advanced 5 per cent., and both issues of Alliance and Dublin have advanced ½, which is equal to a 5 per cent. rise. The Continental companies have been less active, but show undiminished firmness. South Americans are rather more active and steady. The rest present no feature of note. Water has not been well supported, and a falling back in quotations is the result; but the loss is not considerable.

The daily operations were: There was very little doing in Gas on Monday, and the few issues dealt in realized about average prices. Business on Tuesday was mostly in Gaslight "A" at steady figures; and in South Metropolitan "B," which was strong and advanced 2. Water was inclined to be weak. The interest on Wednesday was centred in Gaslight "A," which fluctuated considerably. It rose to 242, and was then knocked down to 239; the quotation being 2 lower. Debenture stocks generally were in demand. Commercial old rose 2. Water was quite neglected. Thursday was a busy day for Gaslight issues of all sorts. Nothing was done in South Metropolitans; but "C" rose 2. Friday was a quieter day; prices holding steady. Quotations of Crystal Palace and Alliance and Dublin advanced as noted above. On Saturday there was more dealing in Gaslight "A;" and the closing price was equal to the worst of the day, though the quotation stood still. In Water, East London and West Middlesex fell 2 each; and Lambeth, 1.

ELECTRIC LIGHTING MEMORANDA.

The Fortunes of the London Electric Supply Corporation—American Practice in Electric Lighting—An Exhibition in St. Pancras.

THE fourth ordinary general meeting of the London Electric Supply Corporation has been held, and seems to have passed off in a manner eminently satisfactory to the Directors—thanks, perhaps, to the highly-scientific manner in which the shareholders were handled by the Chairman, Mr. J. S. Forbes. We say this advisedly; for who shall deny that in this remarkable age and country the profession of joint-stock company chairmanship is not to the full as scientific as that of laying electrical cables and designing dynamos? Nay, what is the skill required for dealing with inert matters like masses of iron and copper, or even with electrical energy itself, when compared with the supreme ability in the management of men displayed by such personages as the Chairman of the London Electric Supply Corporation and of half-a-dozen other big concerns? Upon the recent occasion now under notice, Mr. Forbes had to perform a task that might have daunted a less able man. He had to admit that the Company have sunk over half-a-million of money, in attempting to establish a system of electric lighting differing in character from anything else in the world; bristling with difficulties; and, in the opinion of many eminent authorities, foredoomed to failure. On the top of all this came the disastrous fire at the Company's chief distributing station, which lost them the winter's business, and seemed to justify all the croaking that had been spent upon the Company's venture. Probably no Board of Directors ever had to bear a heavier responsibility than has weighed upon Mr. Forbes and

his colleagues during the past year; and no engineer has ever had either greater difficulties or a finer opportunity than their young Engineer, Mr. S. Z. de Ferranti. But the Directors believed in their Engineer, and stuck to him through everything; and he has justified their confidence by triumphantly doing what nearly all other electricians have declared to be impossibilities. Whether or not the Company will ever make a good profit, of course remains to be seen; but, in the meantime, the splendid spirit displayed by Board and Engineer in grappling with their troubles, and agreeing to sink or swim together, deserves recognition. If they were gas people, we should be proud of them; and we do not see why we should not cordially admire them because they happen to belong to a different industry.

We commented last week on the view taken by an American newspaper of the introduction of electric lighting into the streets of the City of London, and of the revival of electrical business generally upon this side of the Atlantic, which it was feared would soon leave the Americans behind if they did not bestir themselves. This was naturally a dreadful prospect for a Yankee newspaper man, who must feel very discouraged indeed to admit that he may be compelled to stop "cracking up" his countrymen, and play the candid friend to the extent of hinting that they do not in all respects "lick creation." This particular newspaper criticism contains several characteristic points, of which the following is a specimen: "It is quite clear that we have much to learn from European old-world methods in the way of employment to the best advantage of the electrical knowledge and experience which we possess. With a talent for discovery and invention which is not surpassed—nay, which is not equalled—by any other race, our countrymen lead the world in every field of discovery upon which they enter." This is the sugar coating of the pill, laid on thickly in order to mask the bitterness of the confession that "in the employment of electricity as a motive power and as an illuminant, we are certainly behind many European cities." We are not concerned to discuss the validity of this ascription to Americans of pre-eminence in discovery and invention; but we may be permitted to offer an interpretation of the other remark. Electric lighting in the States was "rushed" before its *technique* was perfected. Speculation seized hold of the imperfect systems brought out in a hurry by clever but necessarily inexperienced inventors, and planted them out everywhere in the cheapest, roughest manner. There was nobody to object, although local authorities were induced to pay dearly for lights that were out half the time, and involved the spoiling of streets by poles and wires. Thus the cheapest and most imperfect systems obtained a prescriptive right to the towns of the United States; while the more prudent local governments of Europe managed to hold the speculators off until much that was most objectionable in their methods had time to slough off in the natural way. It was a case in the States, as usual, of "more haste, less speed."

The Vestry of St. Pancras appear to be getting on with their electric lighting scheme, which is modelled upon that of St. James's Company; and with a view to popularizing the notion of the light in the parish, an exhibition of lamps and apparatus has been prepared in the Vestry Hall. The show was opened by the Lord Mayor in State on Monday last week. It seems to be a fair collection of interesting articles; but the intended *éclat* of the opening ceremony—the word is a very proper one in such a connection—was destroyed by a breakdown of the temporary electric lighting plant which had been procured for the occasion. Of course, it would be unfair to exaggerate the importance of what was really a trivial, but most annoying accident; but at the same time these manifestations of the "malignity of matter" are amusing, more especially when they come, as if of malice prepense, to disconcert "cock-sure" inaugurators. The same kind of thing happened on the occasion of the Edison banquet at the Crystal Palace nine years ago, when the previously-arranged oratorical commemorations of the fact that incandescent lighting had "come to stay" suffered wofully from having to be pronounced in presence of gas and candles. However, the civic and parochial magnates made the best of a bad disappointment on Monday, and indulged to their heart's content in that language of hope which seems to be so inseparable from electricians' tongues. Truly, when listening to them, we feel the force of the saying that "man never is, but always to be blest." The Vestry of St. Pancras propose to supply at 6d. per unit, equivalent to gas at 6s. 6d. per 1000 cubic feet. We shall see how much trade they will do at this figure.

INQUIRIES AND INQUIRERS.

From time to time we receive from indignant correspondents copies of those peculiar products of modern gas administration, commonly known by the name of Inquiry Circulars, usually in company with more or less irate demands as to whether we think "this sort of thing" ought to be countenanced. And it must be confessed that some of these inquiries are of a very curious character indeed. When, for instance, a secretary of a gas company who happens also to be the manager receives from a perfect stranger a peremptory request for information as to the amount of the manager's salary and allowances, and the extent of his duties, he is naturally inclined to resent the inquiry as insulting, or at any rate impudent. We were recently assured that the protests which we have consistently made in the Journal against the Circular of Inquiry nuisance have had a marked effect in checking the growth of what at one time threatened to amount to a serious evil. We shall always discountenance a certain order of inquiries, for which directors, committee-men, and lawyer-secretaries are chiefly responsible, and which may be generally described as attempts to obtain for nothing, information designed to enable the inquirers to manage their own business. It would seem, from the frequency of such attempts, that the rule of common courtesy as between man and man in the matter of letter-writing is in danger of being forgotten. It used to be an elementary rule of politeness that a letter addressed to a stranger is as much an intrusion as a personal entry upon his premises. The punctiliousness of requiring an introduction in form to a man of business when a matter of business necessitates our making his acquaintance, has been very extensively abrogated. The modern conception of a professional or business man in his office is rather that of a shopkeeper behind his counter than of a gentleman in his *sanctum*. At the same time, courtesy counsels us to remember that even though we may approach a shopkeeper across the counter without the formality of personal introduction, our excuse for so doing is only the common link of a business interest. We have no more right to talk to a salesman or counter clerk about his private affairs than we have to take the same liberty with a duke. Professional men occupy precisely the same footing. Only the excuse of a common business or professional interest warrants us in approaching them either personally or by letter without an introduction. But it certainly appears sometimes as though the idea had become general, that merely learning a gentleman's name and address, which can be done by means of a directory, is sufficient to justify anyone in writing to him. We could not blame a man if, when pestered beyond endurance by the "circulars" of all kinds which cram his letter-box, he should adopt the drastic remedy of returning them all through the post without prepayment.

While we must condemn some kinds of circular-inquiries as intrusive nuisances, however, we must in fairness consider the good purpose which they may sometimes serve, and which cannot be so easily managed, if at all, in any other way. It is a matter of common observation that while the beginnings of many things are freely advertised, what happens afterwards is apt to be shrouded in obscurity. This is especially true of new inventions, new systems or processes, and, in short, new departures generally in regard to matters interesting to those who do the work of the world. These come before the public with a flourish, and every fresh "installation" is duly notified through the proper channels. But to keep a knowledge of their working results up to date is the mark of a well-informed man. How often does one hear the query: "What has become of the —— process, which was making such a noise in the world a year or so ago?" And it is by no means easy to make sure that such information as common rumour can afford us upon the subject of an inquiry is reliable. Rumour is not always the "common liar" of traditional repute. In political and social matters, reports travelling from mouth to mouth grow notoriously distorted; but this is because their subject is usually meant to be defined with some accuracy of detail. In regard to industrial and trade matters, on the contrary, details seldom enter into rumours, which are usually confined to such indefinite summary of results as can be trusted to be repeated round the world without much modification. That such a process is "doing fairly well," or is "hanging fire," or has "dropped through," are rumours likely, on the whole, to be reliable, just as in the case of an individual who is said to be "coming on" or "gone wrong." If we can rest content with such general information, it is likely to be accurate.

It often happens, however, that a common rumour is not sufficient for our purpose, but only whets our desire for details. These no prudent man dare take at second hand. In the case, for example, of a manufacturing process, which the manager of a gas-works or other industrial establishment is pressed to adopt, he may have heard flying reports either for or against it; but, being hearsay evidence at best, he cannot cite them as valid reasons for taking any particular course with regard to it. He wants details. But how is he to obtain these except by inquiry? and how is the inquiry to be made unless by the much-abused "circular"? It may be said that he should proceed to question his friends and acquaintances upon the subject; or, if reliable advice is required, professionally consult a specialist But the former resource may fail; and the latter be inapplicable, as in the case when a statement of a matter of fact is required, not an expression of advice.

The difficulty is a real one; but we are by no means disposed to lightly recommend recourse to the "letter of inquiry," whether circular or individual, until most other methods of obtaining information have been exhausted. It should be among the last resources of the puzzled official, instead of the first thing to be thought of by him. We receive many inquiries which, if published under the rather obsolete heading of "Answers to Correspondents," would appear anything but creditable to the writers. Such queries as "Where shall I find" something or other which the inquirer has a dim notion

of having seen in a back number of the JOURNAL, re very common; the writer apparently considering that a subscription for a copy of this publication entitles him to the services of a clerk to look up references whenever he wants them. We are also favoured occasionally with a demand for a concise account of the present state of gas engineering opinion upon the question of gas purification, generator firing, or some such neat little topic, with references to authorities whose views have appeared in our columns and elsewhere. This is flattering, but not pleasant. The proverb says that a fool may ask more questions than a wise man can answer; but it is equally true, and to the point, to observe that more questions can be written down upon a half-sheet of note paper than an expert could satisfactorily answer in a day's hard scribbling.

In the case of information being required respecting definite points of a matter with which a certain person or persons are identified, these cannot complain of being asked questions respecting it. Willingness on the part of a gas manager to make trial of a particular process involves consent to satisfy inquiry as to the results of the experiments; and it is silly for a person so situated to object to make known his opinions to anybody who has a *bonâ fide* interest in asking for them. This does not often happen, however; the understood obligation to communicate the result of experiments being almost invariably acted upon. Resistance to inquiry does not come from gas engineers who are known to be in possession of definite information which they may be reasonably asked to communicate for the public benefit. Neither do we, as conducting a highly specialized JOURNAL, object to answer questions relating to matters concerning which we may be reasonably supposed to possess peculiar knowledge. Indeed, we welcome such inquiries; but we stand upon the same ground as all professional men in objecting to be troubled with queries that well-informed people ought to be able to answer for themselves, or that ought to be submitted to professional advisers. We shall never be guilty of cheapening legal or engineering advice.

Circular-inquiry letters would be less resorted to if those who feel constrained to fly to this recourse of the destitute of information, would think twice before laying themselves under an obligation to strangers for assistance. In the first place, intending querists ought to ask themselves whether the information they require may not be regarded as matter which a well-informed man ought to have at command, without troubling anybody else. It is a man's duty to keep himself informed of everything connected with his occupations and general affairs which can be obtained from the ordinary sources. It is sheer impertinence when people ask others for information which but for their own neglect of their opportunities might equally be theirs. Nothing like advice, and only expressions of opinion to a very limited extent, may be invited in this way. Returns of matters of fact, such as Parliament orders upon occasion, are therefore the only proper subjects for a circular-inquiry; and even these must be such as cannot be collected by the unassisted effort of the investigator, and can be shown to be needed for a reasonable purpose. The latter consideration is a most important one, because weak gas directors and committeemen, for example, are only too prone to shuffle out of the difficulty of arriving at a satisfactory independent solution of a question of administration by deciding "to do like the others," which may mean copying results without taking due note of circumstances. Everybody but a member of a corporation gas committee knows that what is a reasonable price for gas in his district is a question not of the price at which similar gas is sold next door, or over the way, as it might be in the case of groceries, but of the cost of making it on the spot. It is the same with many others things, from the salary of the manager down to the price of coke. Therefore, it is necessary to protest in the strongest manner against the circular-inquiry, or any other means of applying the system of adjustment by average comparison to the regulation of matters that ought to be settled upon their merits. The circular-inquiry is at best a permissible nuisance. It is far more commonly employed by local authorities than by companies. Many of the ablest and strongest gas engineers and secretaries have never had recourse to it. As a confession of weakness, it should be avoided whenever possible; and as a possible agency for the degradation of gas engineering, it should always be regarded with the gravest suspicion by recipients.

Sir F. Abel had the honour last Wednesday of being invested by Her Majesty with the insignia of the Civil Division of the Second Class of the Order of the Bath.

Death of Mrs. Garnett.—We regret to announce the death, last Wednesday morning, after a long illness, of Mrs. Garnett, wife of the highly-respected Engineer and Secretary of the Ryde Gas Company, and ex-President of The Gas Institute. Our readers will see, by the report of the proceedings at the recent meeting of the South-West of England District Association of Gas Managers which appears in another column, with which Mr Garnett has always been closely associated, that a vote of sympathy with him, in the domestic affliction by which he was then surrounded, was unanimously passed by the members; and we are sure that this expression of feeling will be extended to Mr. Garnett in his present bereavement by his numerous private and professional friends all over the country.

NOTES.

Bidwell's Selenium Photometer.

It is of interest, in connection with the search for an automatic photometer, to follow the detailed description of Mr. Shelford Bidwell's experimental arrangement, whereby the extinction or diminution of light falling upon a selenium cell causes an incandescent electric lamp to be lighted up. In this arrangement there are three electrical circuits, which makes it appear more complicated than is really the case. The first circuit includes a battery of 24 small Leclanché cells, the selenium cell, the magnet coils of a relay, and also a galvanometer. In the second circuit is a single-battery cell, connected with the tongue of the relay, and also with an electro-magnetic switch. The third circuit contains the lamp battery, the lamp, and the tongue and stop of the electro-magnetic switch. The selenium cell has a resistance in the dark of about 50,000 ohms, which is diminished to one-half or less by the action of diffused daylight or by the light of an ordinary gas-jet at a distance of a foot. The connections being made, the relay is adjusted until the tongue presses against a stop on one side. Exposing the selenium cell to a strong light sends the tongue of the relay over to an opposite stop, and the lamp goes out. It is possible to so adjust the relay that the incandescent lamp is lighted (or a bell rung) whenever the external illumination falls below any desired degree of intensity. The adjustment will remain perfect for days and weeks together. The following tests illustrate the sensitiveness of the arrangement. The relay was adjusted so that the lamp circuit was just closed when a standard candle was burning at a distance of 7½ inches from the selenium cell. The candle was moved slowly towards the cell, until the distance between them was reduced to 6½ inches, when the increased illumination caused the lamp circuit to be broken. The candle was then moved back; and when it was again 7½ inches off, the circuit was once more closed. By moving the candle backwards and forwards over a range of about 1 inch, the circuit could be alternately closed and broken as often as desired.

A Mechanical Comparative Photometer.

A suggestion of mechanical photometry is given in a paper submitted to the Royal Society by Mr. W. Brennand. The first experiments have been directed to the measurement of the light-intensity of the sun and sky, as compared with that of a standard candle. The method of registration adopted by Mr. Brennand is the darkening produced in sensitized paper. He cuts strips from a uniform sheet of ordinary photographic paper, and the observations being relative, he obtains the same results (ratios) from any paper. He assumes that in the burning of a candle the chemical action is proportional to the weight of material consumed; and he takes for his unit of measurement of actinic effect, the darkening produced at a distance of 1 inch from the wick of the candle while 100 grains were consumed. This in the candle Mr. Brennand used in India, where the experiments were commenced, occupied about 47 minutes. The exposure of the sensitized paper to the light of the sky, &c., was effected by the gradual raising of a sliding shutter which covered it, and which after exactly 16 seconds was suddenly dropped. The shutter was moved simply by the falling of a float in a vertical water-pipe, to which it was attached by a string, as the water ran out from a cock at the bottom. In this way the paper was tinged with a gradually intenser depth of colour from 0 to 16 seconds. If, for example, the tint produced by a light upon a portion of the strip of paper representing an exposure of six seconds, was afterwards found to be equal to that produced by another light-source in ten seconds, then Mr. Brennand would assume that the power of the one light was 0·6 that of the other. By comparing a strip thus gradually shaded in proportion to the time, with another strip shaded as the inverse square of the distance from a near source of light, it is readily shown that the effect of a light acting at the distance unity for four seconds is equal to that of the same light acting at the distance ½ for one second. Observations of these ratios can be made with any uniform piece of paper from which the strips are cut, as the error introduced by want of uniformity in one sheet of paper is inappreciable compared with the margin of possible error in comparing the tints.

The Sulzer Engines.

Messrs. Bryan Donkin and Co. are drawing attention to the Sulzer patent steam-engines—single, compound, and triple—of which they are the sole makers for Great Britain and Ireland. These engines are in very extended use on the Continent; and the smallest consumption of steam yet registered is claimed for them. Cylinders are provided with a proper steam-jacket, and protected from radiation. The four double-seated valves (two for the steam and two for the exhaust) for steam distribution are placed at either end of the cylinder. This arrangement allows of easy access to the different parts of the valves; and any water condensed in the cylinder is carried off by the two lower exhaust-valves. These valves have a large seating; and being balanced, there is hardly any weight to lift. Experience shows that they remain tight for almost any length of time, and do not wear. This is one of the principal advantages of this type of engine in comparison with others. A single shaft driven by wheels directly from the main shaft, sets the valves and the governor in motion. The general design of the engines is good.

In single-cylinder engines, the consumption of steam per indicated horse power varies, according to the power used, from 17 to 22 lbs. with condensation, and from 22 to 28 lbs. without condensation, with an initial pressure of 75 to 120 lbs. per square inch. In tandem compound condensing engines, the consumption of steam, at an initial pressure of from 100 to 120 lbs., is from 13·8 to 16·5 lbs. per indicated horse power. With triple high-pressure expansion condensing engines, the consumption of steam is as low as 11 or 12 lbs. per indicated horse-power.

TECHNICAL RECORD.

EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

The Fifth General Meeting of this Association was held on Thursday last, in the historical Guildhall at Lincoln. Although this city was rather remote for most of the members, there was a very fair attendance from all parts of the district. Several friends were also present, among them being the President of the Incorporated Gas Institute (Mr. J. Hepworth, of Carlisle). At the commencement of the proceedings, the outgoing PRESIDENT (Mr. J. Barton, of Peterborough) occupied the chair.

AN OFFICIAL WELCOME.

The MAYOR (Mr. Edwin Pratt), having been introduced to the meeting by the President, said that, on behalf of the citizens, it was his privilege and pleasure to offer the members a very hearty welcome. At all times it gave them pleasure to welcome strangers among them. On this occasion, however, it afforded him especial gratification, because he knew that they were not there merely as sightseers, but had assembled more particularly for the transaction of the business of the Association. From a commercial point of view, the city did not offer many attractions; but, from a historical standpoint, he ventured to say that very few towns in England could afford a wider field of interest. They pointed with pride to their historical associations, and also to that magnificent pile of buildings (the cathedral) which the members had arranged to visit. He hoped the day would be a pleasant and agreeable one, and that the result of their deliberations would be of advantage to every one of the members.

Mr. HEPWORTH said he had been asked to acknowledge the gratitude of the Association to his Worship the Mayor, and to propose a vote of thanks to him, for the very kind and hearty welcome he had given the members. He was one of those who came a considerable distance to be present; and he felt it was worth a long journey to have such a graceful welcome accorded them as they had just received.

Mr. W. BARRATT (Grantham) seconded the motion, which was unanimously carried.

The members having partaken of refreshments which had been kindly provided, in the ante-room of the Guildhall, by the President-Elect (Mr. J. Carter),

The PRESIDENT introduced to the meeting Mr. W. T. Page, the Chairman of the Lincoln Corporation Gas Committee.

Mr. PAGE said he had been introduced to the members of the Association as the Chairman of the Corporation Gas Committee; and when Mr. Barton said that, he said everything that entitled him to any consideration whatever. It might be that many of those present were managers of private companies, and not serving under corporations. It was only five or six years ago that the Corporation became the owners of the Lincoln Gas-Works, which had previously been successfully carried on by a private Company. The acquisition of the works by the Corporation arose in consequence of the Company applying to Parliament for extended powers with reference to capital; and at the same time they desired to be placed under the sliding scale. The Corporation thought it their duty to find out what would be the effect of the sliding scale upon the consumers of gas; and it was found that the shareholders would have been able by it to pay at once an increased dividend. Negotiations then took place between the Corporation and the Company, with the result (he was speaking from memory) that the shareholders were assured their maximum dividends in perpetuity; and he thought the city had no reason to be dissatisfied with the bargain. Speaking with reference to the policy which the Corporation had adopted in regard to the gas undertaking, he said that, of course, as far as the Committee were concerned, they were at first pure novices in gas matters; and personally he did not know a great deal now. It was suggested to the consumers that, if the Corporation purchased the works, there would be a reduction in the rental paid for meters, which was then 1s. per quarter. The further hope was dangled before their eyes that the Corporation would be able to produce and supply gas considerably cheaper than the Company. It was a great deal in favour of Mr. Carter, their excellent Engineer, when he said that these results were accomplished in a very short time; for whereas in the case of many other undertakings the price of gas had been increased, in Lincoln they had been able to reduce the meter-rents to 6d. a quarter, and the price of gas to 2s. 6d. per 1000 cubic feet—a price which must be eminently satisfactory to the purchasers of the commodity. The Committee urged upon Mr. Carter that the gas he produced should not only be cheap, but of the very best quality and of the greatest purity: and it seemed to him (Mr. Page) that if the proprietors of gas-works were to hold their own, and to discharge the duty they owed to their consumers, they must see that the article they supplied was beyond question as regarded its illuminating power and the purity.

Mr. C. E. JONES (Chesterfield), in proposing a vote of thanks to Mr. Page for his remarks, said it was very gratifying to the members to hear how very successfully the Lincoln Gas-Works had been managed; if it were otherwise, they would have been somewhat disappointed, knowing what manner of man Mr. Carter was, and also the great ability and assiduity he brought to bear upon the duties he had to perform. They had to congratulate Mr. Carter on possessing such a very able Chairman as Mr. Page. It was also gratifying to find at Lincoln a small departure from the practice and policy of some other corporate bodies—in maintaining the purity and illuminating power of the gas, without regarding the amount of profit they could squeeze out of the consumers. The question of the purity of gas was quite as important as that of illuminating power; and he believed the time would come when it would be possible to supply gas absolutely pure—that was with respect to sulphur compounds, or anything of a deleterious character.

The motion was carried by acclamation.

MINUTES OF LAST MEETING.

On the suggestion of the HON. SECRETARY (Mr. H. Wimhurst, of Sleaford), the minutes of the meeting held at Great Yarmouth in September last were taken as read.

ELECTION OF NEW MEMBERS.

On the proposition of Mr. JONES, seconded by Mr. F. WELLER (Southtown, Yarmouth), the following gentlemen were elected members of the Association: Mr. C. Panchen, of Yarmouth; Mr. J. W. Portass, of Bishops Stortford; Mr. C. G. Grimwood, of Sudbury; Mr. J. Mason, of Oakham; Mr. H. D. Duesbury, of Cambridge; and Mr. Brook Gibson, of Haverhill.

ANNUAL REPORT.

It was agreed, on the motion of the PRESIDENT, seconded by Mr. T. GREAVES (Melton Mowbray), that the annual report of the Committee should be taken as read. It was as follows:—

Your Committee have pleasure in presenting their second annual report to the members of the Association, and express satisfaction at the progress made by so young an institution. Two half-yearly meetings have been held—the spring meeting at Peterborough, and the autumn meeting at Yarmouth.

The number of members on the 1st of January, 1890, was 39; 10 new members were elected during the year; and 5 members resigned—leaving the number of 44 as members on Jan. 1, 1891, which number, the Committee hope, will be largely increased in the near future.

The balance-sheet shows that the year began with £7 8s. 3d. in hand; and subscriptions were received amounting to £26 6s.—a total of £33 14s. 3d. The expenditure has been £17 9s. 8d.; leaving a balance in hand at the end of the year of £16 4s. 7d., and only one subscription outstanding.

At the spring general meeting, the President (Mr. John Barton) delivered his Inaugural Address, which was of great interest to the profession. Mr. W. Drewry also contributed a paper upon "Experience with Subsided Gas-Mains," from which proceeded a good discussion. The members then made an inspection of the Peterborough Gas-Works, and also of the Peterborough Cathedral; afterwards dining together.

The autumn meeting of the Association was held at the Town Hall Yarmouth, when practical papers were read by Mr. James Lees and Mr. J. E. Buckle—on "How to Maintain and Increase the Popularity of Gas" by the former, and on "General Matters connected with the Working of Small Country Gas-Works" by the latter gentleman Both papers were fully discussed by the members. Mr. John Carter was elected President; Mr. A. Mead, Vice-President; Mr. H. Wimhurst, Hon. Secretary and Treasurer; and Messrs. A. Mitchell, E. J. Brockway, and C. W. Grimwood, on the Committee for the ensuing year. Upon the conclusion of the business of the meeting, the members took lunch together; afterwards visiting the works of the Great Yarmouth and the Gorleston and Southtown Gas Companies, over which they were kindly conducted by Mr. W. J. Carpenter, Engineer of the former Company, and by Mr. F. Weller, Engineer of the latter Company. The members then proceeded by coach to Somerleyton, and visited the grounds of Sir Saville Crossley, Bart., M.P., whose kindness was much appreciated; returning to Yarmouth to dinner, under the presidency of the President, supported by the Mayor of Yarmouth and Directors of the Gas Companies. The thanks of the members are due to Mr. W. P. Brown, Mr. W. J. Carpenter, and Mr. F. Weller, for making the local arrangements for this meeting, which one and all so much enjoyed.

The thanks of the Committee are due to those gentlemen who have supported the work of the Association by the reading of papers; thereby rendering great service in promoting knowledge which must be of benefit to the members generally.

The Committee hope that each member will use his influence on behalf of the Association, in the reading of papers and by inducing other gentlemen to join in the work of the Society by becoming members.

THE NEW PRESIDENT.

Mr. BARTON said the time had now arrived for him to leave the chair; but before doing so, he wished to thank the members for the assistance they had rendered to him during his year of office, and also the gentlemen who had contributed papers at the meetings. He must also thank their esteemed Secretary; for he had made the work of the year very light, and had been

indefatigable in carrying out his onerous duties. He wished Mr. Carter every success, and trusted that the kindness and courtesy which he had personally experienced would be extended to him, and that, at the close of his term of office, they would be able to look back on a profitable and interesting year.

Mr. CARTER then took the chair amid applause, and proceeded to deliver the following

INAUGURAL ADDRESS.

In addressing my observations to you from the presidential chair, allow me at once to express my deep sense of the honour you have conferred upon me. It will be my duty and privilege to serve the interests of the Association during my year of office to the best of my ability; and when, at its close, I relinquish the dignity and responsibility of the chair, I shall be satisfied if I have earned the verdict of your approval.

I do not claim for my remarks that they are likely to contain anything new to you; but I propose to refer briefly to some of the circumstances which at the present moment are of interest to us as an Association of Gas Managers. It may be said, I think, that the matters of the greatest importance to us, and which have during the past year most deeply affected the interests of the industry with which we are connected, are of an external rather than of an internal or technical character. One or two subjects of the latter description, however, may be worthy of passing notice.

In the early months of last year, the new principles with regard to the guide-framing of gasholders, which are associated with the name of Mr. W. Gadd, were put to the test of practical working, when a new double-lift holder was erected at Northwich; the usual upper guides being entirely dispensed with. The wire-rope system of Mr. Pease has also received its share of attention. As far as experience enables us to form a judgment, we have no reason to doubt the success of the new inventions; and those gentlemen, by their industry and skill, have laid not only managers, but proprietors of gas undertakings under great obligations to them. You all know perfectly well what a large proportion of the expended capital of a gas undertaking is absorbed by the holders. Speaking generally, not less than one-sixth of the entire capital outlay is spent upon this part of the plant; and in smaller works the proportion will reach one-fourth. Such a material diminution in the cost of these vessels as is effected by the new system, will prove of great benefit to us. Capital charges constitute a most potent factor in determining the commercial success of any industrial concern; and with regard to our own, this is a decided step in the right direction. It is not simply a modification; it is a revolution in gasholder construction, and is in itself sufficient to mark the past year, and make it memorable.

The year will also be remembered as that which witnessed, if not the introduction, at any rate the adaptation of the principle of the inclined retort. As it has not yet passed out of the experimental stage, it is too early to say whether it will generally replace the horizontal system with which we are all familiar. In several places the inclined retort is being, or is about to be, subjected to a practical test; and we shall await the result with great interest. Such a complete modification of the conditions of carbonization as will obviate the heavy and exhausting labour which at present characterizes our retort-house work, will be well worth the additional cost the new settings involve.

In the face of the competitive lighting agencies which we have to meet, the industry generally, judging by the published reports, is in a very sound and satisfactory condition; and a large extension of business, partly accounted for by the exceptionally severe winter through which we have recently passed, is the general experience of gas managers. Upon the first introduction of electric lighting into this country, the gas industry was thought by some to be threatened with speedy extinction. The value of its securities fell to a very considerable extent; and apparently the impression seized the minds of not a few that gas was one of the resources of civilization which was about exhausted, and would very shortly be regarded only as a relic of the past. How completely these prognostications have been falsified, is matter of history. The growth and development of gas manufacture throughout the country since that time is striking. Taking the figures contained in the Board of Trade returns for 1882 and 1889 as the basis of comparison, the tonnage of coal used in the manufacture of gas during that period increased from about 7¼ millions to rather more than 9¼ millions per annum—equal to 32 per cent.; and the make of gas shows an annual increase of 35 per cent. One very satisfactory feature in connection with these facts is, that even in districts where the electric light has been most largely adopted, the development of the business of the gas undertaking has not, to any appreciable extent, been impeded. Gas and electricity appear to grow side by side.

More than this, the manufacture of gas is conducted under much more improved conditions than obtained twelve or fourteen years ago. The coal is carbonized with a less expenditure of fuel, and better results are being obtained. Managers were satisfied with a make of 9000 cubic feet to the ton even in fairly large works; but now we are not content unless 10,000 cubic feet to the ton are accounted for in the rental. The selling price, owing to the improvement in manufacture and the extension of business, has during these years been materially reduced. In addition to all this, we have now much better appliances for the consumption of gas; and, owing to the labours of Siemens and others, we may be supplied with burners by which a duty of 10 candles per cubic foot can be obtained from gas having a photometrical value of from 16 to 17 candles. These facts are interesting in themselves; but, taken together, they indicate that, commercially considered, the gas industry is in all respects in a much stronger position than formerly, and therefore better able to maintain its ground among the various competing illuminants occupying the attention of the public.

If this position is to be maintained, a low selling price is an indispensable condition. That the quality of the gas supplied must be satisfactory, both with regard to its illuminating value and its purity, goes without saying; but consistently with this it cannot be too strongly urged that our chief element of strength lies in the cheapness of the article we manufacture and supply. Given a low selling price, we can successfully compete with other illuminants, and may with confidence expect an increased demand for domestic and industrial purposes.

However deeply convinced the manager may be of the policy of supplying cheap gas, and however desirous to do so, present conditions are certainly not favourable. We have within the past eighteen months experienced an unexpected rise in the price of coal, in many cases amounting to from 4s. to 5s. per ton; and the manufacturing cost of gas has been increased at once by 6d. per 1000 cubic feet. It is true that coke has realized higher prices; but the value of other residual products has not been to any appreciable extent enhanced, and so the greater part of this extra charge falls upon the undertaking. The question which exercises our minds just now is, Will coal maintain the high price at which it stands? After the experience of the past two years, he would be a bold man who would venture on a prediction. Last summer we heard a great deal concerning a supposed ring formed by the gas-coal owners of a certain district; and in all probability some sort of an arrangement existed, the purpose of which was to secure higher contract prices than, in our opinion, the circumstances justified. The combination to some extent succeeded; but though such a movement may temporarily occasion much inconvenience and expense to those in the market, it cannot in the nature of things exist for any length of time. The ordinary conditions of trade, which really determine commercial values, will inevitably assert themselves. Probably we shall see some reduction in the price of coal; but there are no present appearances which warrant us in expecting a return of the exceptionally low rates which prevailed two or three years ago. As far as I am able to judge, that is placed out of the range of probability by the increase of miners' wages and by the equilibrium which has apparently established itself between the supply and the demand.

Another phase of the coal question has been brought prominently before us recently, in the difficulty of obtaining regular and adequate supplies. It is now the inevitable practice of coal-owners to protect themselves against any liability to deliver during strikes, and to insert in the contract notes a special clause for that purpose. The gas manager, therefore, who would face the winter season free from anxiety with regard to his supply of coal, must make provision for larger stocks than were, under more settled conditions, necessary. A month's consumption in midwinter should be the minimum store, and where possible even double this quantity. This may require, in some cases, considerable outlay in providing storeage accommodation, and in all cases would involve the employment of a larger amount of working capital. But it is far better to spend in this manner and be safe, than to incur the expense of rushing into the market in the midst of a panic, and be subject to the strain and anxiety which a failing coal supply invariably occasions.

Another element of a disturbing character is to be found in the unsettled relations between the employers of labour and their workmen. As one of the great industries of the country, gas-works have been directly affected thereby. In the district covered by this Association, we have, scattered over a wide area, a large number of small works; therefore the labour question is not of such vital personal interest as in other parts of the country. Nevertheless, I would take this opportunity of stating my conviction that, in the interests of capital and labour alike, some method of settling industrial disputes might, and ought to be adopted, other than the barbarous, inconvenient, and to all concerned, very costly mode of resorting to strikes, of which we have had, during the past year or two, so many deplorable examples. It is a matter for congratulation that Her Majesty's Government, sensible of the great evils which are associated with, and arise out of, these frequent conflicts, have appointed a Royal Commission to inquire into the whole labour question. If their action eventuates in the adoption of some method which will provide for the settlement of labour disputes, without recourse to open rupture, they will render to the commercial interests of the country a service of the most extreme value.

Industrial wars, like national wars, seldom produce a satisfactory solution of the questions in dispute; but often create great bitterness, and sometimes leave behind them the conditions which lead to further trouble. They are costly alike to master and man, and productive of great inconvenience to the public generally. More than this, strikes in gas-works, while they frequently involve the men and their families in much suffering

and privation, may have a disastrous effect upon our business. Gas as an illuminant is popular. In the home, for cooking and heating, and in the workshop, for motive power, it is becoming increasingly popular. But if, owing to labour disputes, the public confidence in the regularity of supply is destroyed, we shall impede the development of business in this direction, even if we maintain the ground already occupied. For this reason, strikes should, if at all possible, be avoided. Personally, I should be pleased to see the Council of The Gas Institute taking action with a view to the establishment of a Board of Conciliation for the prompt adjustment of any difference which may arise in connection with the labour question as it concerns gas-works; and I hope that such action will not be regarded as beyond the range of practical politics. A Board composed of a number of gentlemen of high character and position, representing the employer, and an equal number of representative workmen, would, in my opinion, under all circumstances, be quite competent to arrange any matter of contention which might arise. At any rate, in other industries we are not without examples of the successful operation of such a representative authority as that I suggest.

The question of railway rates is also worthy of special notice, and may, to a serious extent, adversely affect the gas interest in common with others. I need make no further apology for referring to this matter than to state that the freight bill of an average gas-works will exceed the total amount paid for labour in all departments; and in this district it amounts, at a moderate estimate, to from 6d. to 9d. per 1000 cubic feet of gas made. Any proposed increase in these charges becomes a very serious matter. In the schedule of rates and terminal charges, which is still under discussion, the railway companies seek parliamentary sanction to certain maximum charges, which are much higher than those in force at the time the schedule was prepared. As the result of a protracted inquiry ordered by the Board of Trade, the original schedule has been revised, and considerable alterations and modifications made. The revised schedule is strongly opposed by the companies; and the question has still to be fought out in the Parliamentary Committee-room. We cannot afford to regard these proceedings with indifference; nor can we object in principle to the application of the companies for standard maximum rates. In connection with the undertakings we represent, we have maximum prices, which have been fixed by legislation. But in our case the interests of the public are safeguarded by the well-known provisions of the Gas-Works Clauses Act, 1847, which limit the dividends payable by gas companies, and empower local authorities, under certain conditions, to compel a reduction in the price of gas. It is not so with railway companies, although in many districts they possess a complete monopoly. This is not a matter of great importance to those among us who are fortunately placed at competing points. Where two or more railway lines run into the same town, competition will certainly operate to prevent the imposition of excessive charges, but in many places, say in the Eastern Counties, where our friends are entirely in the hands of one company, they will be subject to whatever charges, within the maximum, the railway authorities may determine to exact; and my experience convinces me that the impost will not be likely to err on the side of moderation. The result of the agitation may be a schedule of rates to which no reasonable exception can be taken, as the various commercial communities are fully alive to its importance, and powerful organizations are acting in the general interests of trade. In our own industry the managers in the Midland district have taken it up, as it affects their particular neighbourhood; and I hope we shall have no occasion to regret that this action was not more general.

These are the principal difficulties which, at the present moment, threaten us. At one time they would have been met by the ready method of increasing the price of gas. Happily we have come to regard this step as detrimental to the business with which we are associated. Just in the proportion that we raise our price, we weaken our position, and play into the hands of our competitors. The sounder policy is to encourage and develop the use of gas for general purposes, as a means of enabling us to avoid the necessity of an advance in the selling price. Something has already been done in this direction; and we have been in the habit recently of congratulating ourselves upon the success of our efforts. We hear of 10, 15, and 30 per cent. of the consumers in a given district adopting gas as a means of cooking, and the summer consumption increasing by 20 per cent. This is satisfactory so far as it goes; but we have only touched the fringe of the question, and a wide field is ready for cultivation. Gas-cooking stoves are still, in the main, the luxury of those in easy circumstances; it is our business to make them a necessity in the humbler home of the artizan. Given a cottage cooker, substantially made, and at a moderate cost, fixed at a nominal rental in the homes of the working classes, and we should discover opportunities for popularizing the use of gas to an extent not yet realized. We are too much in the habit of supposing that exceptional precautions are necessary with the smaller consumers to insure payment of the accounts when due; and so, whenever this subject is discussed, it is always in connection with deposits, prepayment meters, weekly or monthly collections, and the like. I question the necessity, and altogether dispute the policy of such steps. We recognize that a greater spirit of enterprise should be introduced into our administration; but we shall also be prepared to take the risk which is associated therewith. With regard to this class of small consumers, my opinion, founded upon experience with thousands of them, enables me to state that the risk will be no greater than with other classes. I have upon my books a great number of working men consuming from 8000 cubic feet to 10,000 cubic feet per annum. The accounts are collected quarterly, are paid regularly, and with exceedingly little loss. I am satisfied that a bold policy in this particular presents great opportunities; for while maintaining the pre-eminence of gas as an illuminant, its establishment as a necessity in the houses of the masses for domestic purposes would place our industry in an impregnable position.

Mr. HEPWORTH proposed a vote of thanks to the President for his exceedingly able address; remarking that he had heard a good many addresses of a similar character, but he did not think there had been one which had interested him so much.

Mr. BARRATT, in seconding the motion, alluded to the remarks made by Mr. Page early in the proceedings. He said it was quite right that gas should be made cheap and good; but he did not think that corporations should arrogate to themselves the credit of making gas cheaper than private companies. The Lincoln Corporation were certainly much larger than the Grantham Gas Company; but the members would not be much surprised when he told them that they delivered gas at the same price in Grantham as they did in Lincoln, notwithstanding that the make in Lincoln was some three or four times more. Though he might be charged with egotism, he could also say that his gas was quite as good.

The PRESIDENT briefly acknowledged the compliment.

VOTE OF THANKS TO THE EX-PRESIDENT.

Mr. JONES moved a vote of thanks to the Ex-President for the satisfactory manner in which he had performed his duties during the past year.

Mr. C. W. GRIMWOOD (Sudbury) seconded the motion, which was carried with applause.

Mr. BARTON acknowledged the vote in a few suitable words.

SOME THOUGHTS ON GAS-METERS.

Mr. BARRATT then read a paper on gas-meters, in which he argued strongly in favour of the use of wet meters. The paper, together with a report of the discussion which followed, will be given in an early issue of the JOURNAL.

PLACE OF NEXT MEETING.

It was agreed, on the motion of Mr. BARTON, seconded by Mr. WIMHURST, that the autumn meeting of the Association should be held at Cambridge.

Mr. W. DUESBURY expressed the pleasure which it would give him to see the members at Cambridge, and assured them that he would do all he could to make the meeting instructive and pleasant.

This concluded the business of the meeting; but before separating, the members passed a hearty vote of thanks to the Mayor for his kindness in allowing them the use of the Guildhall.

Some of the members spent the remainder of the afternoon in visiting Messrs Robey and Co.'s Iron-Works, to inspect a new 7-horse power gas-engine which that firm has recently completed; while others took the opportunity of going to the Cathedral.

Early in the evening the members and friends dined together at the Great Northern Hotel; the Mayor and the Chairman of the Corporation Gas Committee honouring them with their presence.

New York Water Supply.—In July last year the great scheme of water supply for New York was so far completed as to allow of a delivery of water into the city by means of the new Croton aqueduct then finished. But one important feature of the scheme was still wanting—viz., the immense supplementary work known as the Quaker Bridge dam, which, according to the original plans, was to be constructed about four miles below the present Croton dam, and give a total storeage of 34,000 million gallons. This dam had many opponents, on account of its great cost, and the fear that a dam so high, holding such a vast body of water, might not be entirely safe. Its estimated cost was $4,087,000, and it was to be 180 feet in height above the river bed, below which the foundations would go down 91 feet. On account principally of these considerations, the New York Aqueduct Commissioners, in whom the necessary authority is vested, decided upon the construction of a dam designed to be somewhat less expensive, and at a spot presenting fewer engineering difficulties, at Cornell. The new dam, for which the Chief Engineer (Mr. Heley) has been instructed to prepare plans without delay, will rise 159 feet above the bed of the Croton River, the foundations going down 70 feet. Its length between the flow lines will be 1736 feet; and its cost is estimated at $3,650,000. The site selected for the Cornell dam is about 1¼ miles above that which had been adopted for the Quaker Bridge dam, and 2¾ miles below the present Croton dam; and it will give an additional drainage area of 21 square miles, and a storeage capacity of 30,000 million gallons. The Engineer estimates that it will require five years to build the new dam.

MIDLAND ASSOCIATION OF GAS MANAGERS.

The Fourteenth Annual Meeting.

As already recorded in the JOURNAL (see *ante*, p. 447), the Fourteenth Annual Meeting of the above Association was held at the Great Western Hotel, Birmingham, on Thursday, the 5th inst.—Mr. C. STAFFORD ELLERY, Engineer and Manager of the Bath Gaslight Company (the President), in the chair.

The HON. SECRETARY (Mr. J. S. Reeves, of Bilston) read the minutes of the previous meeting, and they were confirmed.

THE REPORT AND ACCOUNTS.

The annual report of the Committee (given in the JOURNAL for the 10th inst.), and the statement of accounts, were then presented; and on the motion of Mr. H. PEATY, of Burslem, seconded by Mr. R. O. PATERSON, of Cheltenham, they were adopted.

NEW MEMBER.

The name of Mr. Thomas Davis, Manager of the Sandbach Gas-Works, was submitted by the Committee for approval; and Mr. Davis was duly elected a member of the Association.

ASSOCIATION REPORTS.

It was next resolved that the volume of "Reports of Gas Associations" for the past year should be supplied to all the members free, as hitherto.

THE PLACE OF NEXT MEETING.

The PRESIDENT said, with regard to the next meeting, he was pleased to state that Mr. Tew and Mr. Cross had very kindly offered the Association, through their Committees, an invitation to hold it in May at Warwick and Leamington. He had much pleasure in submitting a motion to this effect.

This was agreed to; it being left to the Committee to fix the day.

PRESIDENT'S ADDRESS.

The PRESIDENT then delivered his Inaugural Address, which has already appeared (*ante*, p. 447).

Mr. PEATY proposed a vote of thanks to the President for his address, which, he said, had been very instructive and interesting, and showed the wide range included by the industry in which members were concerned. Some of them devoted their attention to one particular subject; but it was at times desirable to have a comprehensive address, to remind them that they could not afford to neglect any part of the questions affecting their interest.

Mr. PATERSON seconded the motion; and it was carried with acclamation.

The PRESIDENT, in returning thanks, said the severity of the past winter, and the additional calls made upon his time in consequence, must be his excuse for not doing more than he had done. He asked the members to co-operate heartily in carrying out the work of the Association.

WEEKLY AND MONTHLY PAYMENTS FOR GAS.

The paper on the above subject read by Mr. J. T. Lewis, of Wellingborough, at the meeting held in November last year,* was then discussed.

Mr. E. H. MILLARD (Hinckley) said: I have been much interested in the subject of the weekly collection of accounts; and I am more than doubtful that the smaller consumers pay where the price is low—say, about 2s. 6d. per 1000 cubic feet—and the margin between the cost of production and selling price must consequently be narrow. I came from a place where the price was 2s., and there was no charge for meter-rents or fixing; and in a case like that there does not appear scope for weekly collecting. As I am now situated, paying nearly 1s. 6d. per 1000 cubic feet for interest and redemption of capital, and 4d. per 1000 feet for rates and taxes, and being in a good position for increased output, I thought if I could get an increased consumption I should be able to make quite as favourable terms as anyone else was doing. I started to consider the subject; and I was much struck with the "sweet simplicity" of putting an additional price on gas to cover meter hire, cost of collecting, fixing meters, and fitting up the houses. When I came to calculate the cost, there were 52 visits to be paid in the year; and as a man can pay about 100 visits in a day, it works out to 2s. 2d. per annum. Cards and books cost 1d. per quarter, or 4d. a year. The average meter-rent in 20 towns is 10d. per quarter; and where special or prepayment meters are used, it would be more. These details run up to 5s. 10d. for the expenses. Taking the consumption as 8000 cubic feet, that came out at 8¾d. per 1000 feet; or if they had a consumption of 10,000 cubic feet, it worked out at 7d. I still require a fair working interest for providing pipes and fittings in the house, which would be 2d. (7½ per cent. on £1). There is a further outlay on the service, and extra leakage which we are all agreed is chiefly from the service-pipes. The average expenditure on repairs of mains and services is ½d. per 1000 cubic feet; and if all our customers were of this description, I should not be far wrong (taking into consideration the extra leakage) in adding ¾d. per 1000 feet to the cost. This would make, with the other items previously mentioned, about 11½d. to be added to the price of gas, which in my case is already rather high—3s. 9d. per 1000 cubic feet. I could not see that it would be a great inducement to small consumers to say we should want 1s. per 1000 feet more from them to cover expenses; and I came to the conclusion that the better way would be to charge the same price to small consumers as to others—namely, 4½d. per 100 cubic feet. For meter hire we charged 7d. per quarter for 2 lights; and then we put on half the price of collecting—3d. per quarter. The consumers pay these sums—7d. *plus* 3d.—at the commencement of each quarter. The increase on our revenue owing to the weekly consumers is 5 or 6 per cent.; and I am fairly satisfied with that. My opinion of prepayment and cash meters is not very high. Mr. Millard then read the following observations on the subject of the results of the weekly collecting system at his works, as contained in a report made to his Committee:—

> As the weekly collecting system has now been in operation for half a year, I beg to give you the results of same, which I consider most encouraging. The total number of names entered in the book up to Jan. 26, was 105. Of these there had been four discontinued; the reason being in three cases owing to removal, and to expense in *one case*. Of the remaining 101, four he decided to go on the quarterly system. It is worth noting that of this number 24 were fixed to disused services, and four were fixed to services which, having been cut off at the main, simply required re-connecting. There are 29 displaced or replaced quarterly customers; but there is no doubt that, without the weekly system, fully one-half of this number would not have become gas consumers. There were 44 who required new services. As showing the growth of the system, on June 2 there were two customers, and the weekly collection was 10½d.; on July 7 there were 28, with a collection of 17s. 0½d.; Aug. 11, 38—18s. 4d.; Sept. 1, 41—18s. 3½d.; Oct. 6, 58—£2 17s. 11d.; Nov. 3, 82—£5 6s. 4½d.; Dec. 1, 94—£5 2s. 5d. The heaviest week's collection was on Dec. 22; being £5 19s. 1d. The total amount collected up to Jan. 26 was £97 19s. 0½d. I have no doubt that the increased revenue from this source for the next twelve months will be not less than £250. There have been added since the report was drawn up ten new customers.

Mr. V. HUGHES (Tipton): You need have no surprise that Mr. Hunt hesitates to say much in favour of the prepayment meter, but prefers leaving it to someone else; and so shall I. We have had the weekly system in force for two or three years, and work it somewhat on the lines followed by the author of the paper and of the last speaker; and we have quite discarded the automatic meter. I agree much more with weekly collections; but I should altogether disapprove of the author's method of charging extra—*i.e.*, increasing the price—to these weekly consumers. We supply them at the same rate as ordinary small consumers. Our price to the smallest consumers is 2s. 9d. per 1000 cubic feet; and we allow a discount of 5 per cent. Now, in ordinary business, if you can get cash in advance, or cash on delivery, it is worth another 2½ per cent.; so by collecting this money weekly, and not allowing these consumers any discount, you get an equivalent of 7½ per cent., which should cover any additional expense. Almost any youth can do the collecting; so that it does not require the payment of a large salary. We have a quantity of tickets, numbered consecutively (similar to railway tickets), each of a certain value. The collector takes out so many, and, of course, should return with so much money, by which means both the cashier and the consumers have a perfect check. These tickets we have found very useful. We have not a large number of weekly consumers, because we have not pushed the matter on account of our deficiency of storeage, in which we have been badly off; but those we have all appear to be well satisfied. The author of the paper asks for an expression of opinion as to methods to be adopted for extending this system. I suggested to my Committee, when we set about the business (it has never been done, though they quite fell in with it), to allow a small premium on each new consumer the collector or canvasser could secure. I believe this would really be found to work very well. No doubt weekly collections are a very great advantage. If you get a bad payer, put him on the weekly system, and you will have little trouble. We have several consumers who grumbled at paying a quarterly account of 10s. or 12s., who pay 2s. or 2s. 6d. a month as readily as possible. There is certainly a great future for the system, and those who try it will, I think, find it answer remarkably well.

Mr. MILLARD: I find I have some old notes which I had prepared for the last meeting; and I will supplement my previous remarks. We hire out two pendants or brackets at ½d. per week for the two; but my customers so far have preferred to purchase, except in a few instances. When hired, we have a small die or stamp to brand the ceiling-plate "Property of the Local Board."

Mr. P. SIMPSON (Rugby): What do you charge for extra work?

Mr. MILLARD: We charge 3d. per quarter for collecting. The cost of piping the houses is borne either by the landlord or the tenant—in no case by the Gas Committee; and we take payment for this, as well as for the fittings, by weekly instalments. The advantages of such a system as I have adopted over that of charging an inclusive price to cover everything are many. First, old customers can be readily transferred to the weekly system. Secondly, it will pay, even in the case of the smallest consumers. Thirdly, it is equitable, which is not the case with the other system. For example, suppose 6d. is added to cover all expenses, and one consumer uses 6000 feet, while another takes 12,000 feet of gas. The one pays 3s., and the other 6s., for exactly the same privileges; and you thus tax the best customers. Other advantages are that where the price is

* See JOURNAL, Vol. LVI., p. 1046.

already rather high, it does not make the gas seem so dear; and there is freedom from all further responsibility and expense of renewals, and avoidance of all legal proceedings at changes of ownership or tenancy.

Mr. C. MEIKLEJOHN (Oldbury): I have for some time been interested in the subject of weekly payments, and have consulted with Mr. Bell on the method he has in use. From my own experience in past years in works where the accounts were collected every six months, and then reduced to three months, I found a marked increase in the consumption, without the complaints generally following such increase. Monthly accounts would have the same effect in a larger degree. We are following local candidates and politicians in catering for the masses in this matter; and I suppose we are right. Whether or not it will pay, and the masses will accept the catering, I cannot say. My own experience, perhaps, is peculiar. I adopted the method of Mr. Bell, in offering to supply pipes, fittings, and meter, and make the connection free; and we only charge 3d. per 1000 feet additional on the price of gas. I endeavoured at first to do without an increase; but we were making a reduction in the price. Although we had 500 circulars printed, setting forth the terms on which we were going to supply gas, we have not had a single applicant for the weekly system. The only reason I can assign is that consumers in my district have souls above weekly payments. (Laughter.) Mr. Lewis and Mr. Bell have evidently solved the question of cost; but I should like to hear how they would overcome the difficulty of the gas consumers not accepting the system.

Mr. J. A. HARRIS (Wigston): I believe this is a step in the right direction, to popularize the use of gas among the masses of the people. I should prefer one factory to a hundred cottage consumers. But factories are not always at our command; whereas the artizan classes are, and we find these do not, as a rule, burn gas. The thing we have to face is how to get at them that they may become consumers. If we take them each quarter, the bills are too much at the end of this period. Considering the better times we live in, I think weekly or monthly payments are the right thing to meet the case; but we have to convince the working man that he is getting value for his money, and that it will be to his advantage to burn gas on the weekly or monthly system—that it will be safer and better all round. I believe we have not sufficiently advertised the utility of using gas for lighting purposes. If there is any new invention in oil-lamps, it is made known all over the country. By more advertising, and giving the public and the British working man definite results, it would help to convince him that it is to his advantage to use gas, and do so by these small payments. A man does not mind 2d., 3d., or 4d. a week; but he does mind paying 8s. or 10s. at the end of the quarter. Gas cannot be obtained price for price, and light for light, at the same rate as oil; but setting the small difference in the cost of gas against the continual breakages of glasses, the labour attached to the daily trimming and feeding of oil-lamps, and the very great danger in using them, I think, with a little business tact, we may largely increase our consumption amongst the middle and artizan classes.

Mr. HUGHES: So far as the fitting up of the houses is concerned, we supply all pipes and fittings, and fix the meter; and the prime cost to us is about 13s. to 14s. for a cottage with two lights, and about 20s. if we fix three lights. We charge 3d. per quarter for the hire of fittings where there are two lights, and 6d. for more than this number. We get the landlord to sign an agreement (which we have no difficulty in doing), giving us liberty to remove the fittings at any time we may wish to do so. We do this simply to prevent the landlord taking possession of the lot. I think the failure of Mr. Meiklejohn and others, is owing to the fact that the working-man can see that he is charged 1d. or 2d. per 1000 cubic feet more than the ordinary consumer; while the only difference in his case is the extra trouble in collecting, which, as I have before remarked, is covered by the discount and cash payments.

Mr. J. WEST (Manchester): I lately talked with Mr. Valon, of Ramsgate, on this subject, and he has a different system to the one we have heard advanced to-day. His plan is to have a meter which allows consumers to pay for any quantity of gas they please, according to their wants. A consumer can buy 1000 or 2000 cubic feet of gas or more; and the inspector takes the amount, and sets the meter to measure this quantity. If the people do not give notice for a further supply, it is automatically cut off. Mr. Valon tells me the system works admirably in his district.

Mr. HARRIS: I believe the cash meter is a step in the right direction. Few consumers can read the ordinary meter; and it is a satisfaction to a man to be able to read the index, and see at a glance how his consumption stands. When he cannot do this, it creates misgivings if the bill is larger than usual.

Mr. CHARLES HUNT (Birmingham): As prepayment meters have been mentioned in terms of praise, I feel it right to say that whatever merit attaches to their introduction in Birmingham does not belong to me. I am content to regard this question of extending the use of gas to small consumers as one of administration, of which the system of collection forms a branch. If the plan is adapted to the means of the class for whom you desire to cater, there can be little doubt but that you will attain your object. Therefore, I am not surprised to hear that the system of weekly collection has proved in many cases a great success. But I hold with Mr. Millard, who hardly seems to have had the courage of his convictions, that the supply to small consumers is not a remunerative source of revenue. He has stated that in his case the extra cost works out at about 1s. per 1000 cubic feet. I shall be interested to hear how he reconciles it to his conscience to charge the consumers a very much lower rate, if that is so. At the same time, the price to small consumers need not be regarded as a mere question of what will pay. When I first came to Birmingham in the time of the Companies, I was informed of the spirit of rivalry then in vogue. Each Company did its best to secure consumers, however small; "for," said they, "the small consumer may grow to be a larger one some day, and then he will continue with us." The workman might develop into a master-man, become a large employer of labour, and consume gas on a very large scale. In this way the use of gas may be largely extended among small consumers. Sufficient light has hardly been thrown on the cause of failure in Mr. Meiklejohn's case. If a desire to burn gas by paying for it weekly exists among the wage-earning classes, it is not easy to understand why this should be confined to one particular district. Why, for instance, should the system of weekly payments be successful at Tipton and not at Oldbury? Is the price of gas higher at Oldbury than at Tipton, or was it proposed to charge more in proportion at the former place.

Mr. MEIKLEJOHN: It is 6d. higher at Oldbury.

Mr. HUNT: That seems scarcely enough to militate seriously against the system. Out of 500 persons to whom the circulars were sent, it is scarcely to be supposed that a difference of only 6d. per 1000 feet would be an obstacle to all. The question has been raised as to whether or not, light for light, gas can be supplied at the same price as oil. This must be answered in the negative. Gas can scarcely be expected to compete, light for light, with oil; but it possesses in other respects very important advantages. It is much less risky, and far more convenient. Gas must stand on its merits as a convenient light, rather than as being the most economical one. I was hoping to hear more of the experience of members with regard to the system which there is room to believe has been tried more extensively than this discussion would lead one to assume.

Mr. MILLARD: As to Mr. Hunt saying I have not the courage of my convictions, my small customers do really pay the extra amount I have mentioned, with the slight exception that I only charge half the cost of collecting, which is met by the freedom from bad debts and the interest on the money through its being paid when due, and also the additional revenue from the cheaper rate at which we can do new and increased business. As an example, last quarter I had a customer who burnt only 2000 cubic feet of gas, and paid, in addition to 7s. 6d. for gas, 7d. for meter-rent, 3d. for collecting, and 6½d. for the hire of two pendants—making a total of 1s. 4½d., or 8¼d. per 1000 cubic feet; and in the summer quarter, if only 1000 cubic feet are consumed, it will mean 1s. 4½d. per 1000 feet. In addition, they paid for piping the house (10s.) by weekly instalments.

Mr. LEWIS: I do not know there is much for me to reply to, as nearly all the speakers have answered each other; and, further, the statements and conclusions of my paper have not been criticized. There are, however, a few questions that have been raised during this discussion; and to these I will refer. Mr. Millard, who has started the plan of weekly collection, makes a great point of the cost of carrying out this system, and gives us various items, which he thinks should by rights be added to the price per 1000 cubic feet of gas, so that it is inclusive of all charges. I do not agree with this plan; for, on consideration, it will be seen that it is impossible to carry it out on any basis that will be satisfactory in practice. Take, for instance, meter-rents. If this item is charged in the price of gas, it is most unfair to consumers who use more than the average, and much in favour of those who use less than the average quantity of gas; in fact, it is making the larger consumers pay for the small ones. Meter-rent, if imposed at all, should be charged separately, as is generally the case. The cost of stationery is no greater with the weekly than it is with the quarterly customer; a quarter's card taking the place of the ordinary form of account. The cost of inspection and collection we find to be covered by the extra 2d. per 1000 cubic feet charged. Beyond this there is no other expense. I cannot see that there is anything in the argument of extra leakage caused by putting services in for weekly or monthly customers. We none of us object to put in a service when requested for quarterly customers, if our ordinary conditions are complied with. We have no guarantee as to consumption; and why should we object on this head with customers on the shorter system of payments? It is not pretended that it pays to supply each individual consumer singly; but taking their total consumption and all expenses into consideration, they certainly do pay to supply, and to go to some trouble to do so. There has been some mention made to-day of experiments with prepayment meters. I hoped to hear something definite about these meters. But no one seems willing to give us his experience with them; and therefore I must conclude that the results are not so favourable as some would lead us to believe. At the last meeting, I showed one of Messrs. Cowan's meters, fitted with Cloudsley's cash-value indicator. I have not the meter here now; but on the table is an ordinary index with the cash-value indicator, for your inspection. We have a number of these in use among our monthly customers; and I think it is

a step in the right direction, whether the appliance is used for weekly, monthly, or quarterly collections. It shows any consumer the cash value of the gas he is using. We know that many of our customers complain of their gas bill at the end of a quarter, and say they cannot have burnt so much gas as they have been charged for. This system of indicating the cash value of the gas used will do away with such complaints; and it must have been a great boon during the past winter. With regard to the letting of fittings on hire, we offered some years ago to supply some in that way, but had very few applications; the great difficulty and hindrance being the piping of the houses ready for the fittings. If the landlord will do this, there is no difficulty about the fittings afterwards. As to the failure of Mr. Meiklejohn's attempt to start a short-payment system, it is difficult to give a reason for this, unless the absence of pipes and fittings in the houses to which circulars were sent is one. Still it is strange that no applications were received after the distribution of the number of circulars stated. Mr. Harris said that the working classes now live in much greater style than they used to do; and that they are not so thrifty as formerly. But I very much doubt if there is a greater want of thrift now than there was 50 or 60 years ago. I think, as a rule, people are more thrifty than they were. As to whether or not oil can compare, cost for cost and light for light, with gas, I showed most conclusively in a former paper,* that gas would not compare favourably with oil, light for light, unless its price is somewhere about 2s. per 1000 cubic feet. I think Mr. Hack corroborated that in some experiments he made. Therefore we cannot say that, for light alone, gas is as cheap as oil when it costs more than 2s. per 1000 feet; but there are other advantages which make it worth people's while to have it. It saves breakages and the trouble of attending to lamps, and so on. I mentioned on a previous occasion that we had in view the supply of a large village 4¼ miles from Wellingborough. Before taking the gas there, the manufacturers named a price which they were willing to pay—viz., 4s. per 1000 cubic feet. We now supply the place; and all the manufacturers are using gas at that price. They have given up their oil-lamps—not because gas would be cheaper, but because the trouble and the nuisance of attending to the lamps were so great. Instead of men being at work, they were found looking after the lamps; and it proved to be very much better to give them up altogether. This seems to me to be the only thing we can press on consumers to induce them to use gas where they now employ oil. When we started our system, I think Mr. Valon had just commenced his; and although his appears to be very successful, I think that there are some objections to it. The principal one is this: You go to consumers, and they pay for a certain quantity of gas; and the meter is set to supply that quantity. If they use more than they expect, their lights go out, and they have to send to the gas office before they can get the supply again.

Mr. WEST: That has been on only one occasion.

Mr. LEWIS: I see that something of the same kind happened elsewhere. But I object altogether to the principle of causing people to pay in advance for the gas to be used. I find our system answers splendidly. We have not such a rush of fresh customers as we should like; but there is a steady influx, which is perhaps better than a great rush. This entails more office work; but the inspection and collection are simple. In the quarter ending at Christmas, the weekly consumers increased from 84 to 98; and the amount paid was £83 14s. 6d. for the gas used by them. That is a very good average. The monthly consumers increased from 66 to 116 in the same quarter; the amount they paid being £209 6s. 3d. I may say that we are so convinced of the importance of this system, that the Directors have decided that in future all consumers shall be on the monthly system—none longer than a month; and where we think it necessary, on the weekly system.

The PRESIDENT: I am sure we shall be united in offering our congratulations to Mr. Lewis on his success in bringing forward this question. I could not help feeling that the subject has two divisions—viz., frequent collection of rentals and letting fittings on hire. With regard to the more frequent collection, many now hold the opinion that it is an advantage in more ways than one. As to letting fittings on hire, my experience is not a happy one. Some 14 or 15 years ago, I thought of adopting the system in a Welsh town. Circulars were distributed; and the result in business was one application. We laid on the fittings—not for a cottager, for the man was a dealer in a large way of business. Although no one knew it, he was on the point of failing. We ultimately got our fittings back; but the cost incurred was more than they were worth. (Laughter.) With that experience, I have not since taken up the hire of fittings. With regard to Mr. Meiklejohn's issue of circulars, it is politic to keep well in touch with consumers. This is done in some places by appointing an inspector to see customers, look at their burners and fittings, and advise generally, in a courteous and friendly way, where necessary. If an inspector had followed the circulars, there might have been some result. [Mr. MEIKLEJOHN: We tried that.] That ground is gone, then. With regard to 2-light meters opinions differ; for in some towns there is a desire to dispense with the smaller-sized meters. About two years ago we thought it might result in business to distribute some boiling-burners among small householders without making a charge of any kind. All we required was that the india-rubber tubing should be paid for. I have had the figures taken out, to get the result in consumption of gas. So far it is not encouraging; but we shall follow it up, with a view to getting more information. Our thanks are due to Mr. Lewis for his useful paper; and I propose that they be accorded to him.

Mr. SIMPSON: I beg to second the proposition, having been much interested in the matter discussed. Some companies have reduced the price of gas for cookers; and why should we increase the charge to cottage consumers? In my town (Rugby) we have many cottages and only one factory. With regard to what has been said about the working classes, I do not think with Mr. Lewis that they are so thrifty as they were in my grandfather's time; and I speak from experience. On some occasions, when the gas bill amounts to 12s. a quarter, it is difficult to pay the amount out of the week's wages; and when the husband has to make some little sacrifice of his own money, I know the gas does not get a good name. The wife has instructions to buy petroleum when she gets her weekly grocery; and the gas is given up. We talk about light for light, and about the cost of petroleum compared with gas; but there is to be taken into account the great expense for glasses and lamps for the former. If you take the cost of petroleum, you should add considerably to the price for these. If you have the weekly payment system, it is best to have an ordinary meter, and have the money weekly for what is burnt, without prepayment. It is a slur on a man to say: "You must pay the money in advance." We have honest poor men as well as honest rich men. What we ought to do is to prevent them getting into arrear; and that is only what is done in every trade.

The vote of thanks was then unanimously accorded.

Mr. LEWIS, in acknowledging the compliment, said he did not require any vote of thanks, as he felt it to be only right to lay before the members the experience gained with the short-payment system in use in Wellingborough, for it was only in this way they could get information one from the other. He was somewhat disappointed with the discussion, as he fully expected more adverse criticism; and he hoped to have a greater number of opinions on the subject.

This completed the business on the *agenda;* and, as already reported, the remainder of the time at the disposal of the members was taken up by an informal discussion on a question raised by Mr. R. O. Paterson.

The members subsequently dined together.

* See JOURNAL, Vol. LI., p. 913.

SOUTH-WEST OF ENGLAND DISTRICT ASSOCIATION OF GAS MANAGERS.

The "Official Report" of the Twenty-Seventh Half-Yearly Meeting.

The Twenty-seventh Half-Yearly Meeting of the above-named Association was held on Tuesday, the 10th inst., at the Offices of the Southampton Gaslight and Coke Company—Mr. S. W. DURKIN, Engineer and Manager of the Company (the President), in the chair. This is the second time Mr. Durkin has been elected to the presidency of the Association; and, by way of showing their regard for him, the members decided to assemble in Southampton. Unfortunately, as stated in the abstract report of the proceedings which has already appeared, the weather was the worst that could possibly attend such an event; and snow and sleet, coming with the force of a "blizzard" sufficed to prevent or retard railway communication with Southampton. As a result, many members were unable to put in an appearance at the meeting. The number, however, was augmented by friends from London and some local visitors.

During the morning a visit was paid to the works of the Company, after which an excellent luncheon was provided by the Directors at the offices. The only toast proposed was that of "The Queen," which was loyally received.

The business of the meeting was then proceeded with.

WELCOME TO THE ASSOCIATION.

The PRESIDENT said there had been every prospect of a large attendance; but the clerk of the weather had ordered otherwise. The Chairman of the Southampton Gas Company had intended to be present, but was prevented by another engagement; but he had the pleasure of introducing two of the Directors—Dr. Trend and Captain Corse Scott—to the members of the Association. He added that the Mayor of Southampton (Alderman E. Bance), the Town Clerk (Mr. R. S. Pearce), the Borough Surveyor (Mr. W. B. G. Bennett), the Water-Works Engineer (Mr. W. Matthews), and Dr. Harris (Medical Officer of Health) would have attended, but were unable to do so.

Dr. TREND said the Chairman of the Southampton Gas Company (Mr. R. C. Hankinson), had written to him, expressing his regret at being unable to extend personally a welcome to the Association, in which he took a great interest, and requesting him to apologize for his absence. A hope was also expressed that every visitor would be well looked after. It devolved upon him then, as the senior member of the Board, to say, on behalf of the Directors of the Company how very glad they were to meet the

Association on any occasion, and especially when their Manager had been honoured by election for the second time to the office of President. They participated in this honour to some degree. Mr. Durkin had grown up in their works from childhood, and the Directors had every confidence in him. That confidence had been ratified by the Association, who would not have elected him to his present position unless he had been worthy of it. The past year had been eventful in some respects. In Southampton they had seen something of the struggle between capital and labour; and it had somewhat influenced their own works. But by the exercise of good temper, tact, and firmness—he emphasized firmness—they were able to carry on operations; and he hoped that the good-will that had hitherto existed between employers and employed would be perfectly restored. He heartily supported meetings such as the present, as doing good, not only as a sort of stimulus in getting together useful papers and discussions, but also as encouraging brotherly feeling, smoothing off individual angles and peculiarities, and making life worth living. He hoped the meeting would be successful, notwithstanding the weather. It was said that everything was double-edged; and although the snow had prevented several friends from attending, the dials of the station meters would give a good account of it.

Capt. Corse Scott said that after the remarks of his friend, it would be superfluous for him to say anything beyond bidding the Association a hearty welcome.

Mr. E. C. Riley (Swindon) said it was his privilege to reply, on behalf of the Association, to the kind remarks made by Dr. Trend and Captain Scott. Personally, he felt great pleasure in coming to Southampton; for although he had known Mr. Durkin but a short time, he held a high opinion of him. This feeling was shared by all the members of the Association; and he was certain that, but for the unfortunate state of the weather, the attendance would have been unusually large—not merely on account of the attractions of Southampton, but from a feeling of respect and esteem to the President. It was very gratifying to be so well received by the Directors. Sometimes a manager, single-handed, felt some difficulty in sustaining the position of President; but this was not so where he had the kind support and help of his Directors, as was the case that day. The rooms so kindly placed at their disposal were most convenient; and he must say that the Directors had arranged everything in a most handsome manner for the comfort and enjoyment of the members, for which he begged to thank them heartily.

Dr. Trend expressed his obligations to Mr. Riley for his kind words; and wished all present a useful and pleasant day.

The notice convening the meeting, and the minutes of the last meeting, were then taken as read, on the motion of the President, seconded by Mr. W. Davis, of Poole.

Votes of Condolence and Sympathy.

The President said that since the last meeting a faithful and energetic friend and member of the Association had been removed by death, in the person of Mr. H. G. Crowe, of Wellington. He proposed that a vote of condolence and sympathy with the widow and family be passed, and that the Secretary be instructed to communicate it.

Mr. J. Nicholls (Crewkerne) seconded the proposition, and it was carried by a standing vote.

The President, referring to a telegram he had received from Mr. G. Garnett, of Ryde, said their old friend and Past-President had been afflicted, not only in his household, but in bodily health. He would ask the Secretary, in acknowledging the message, to convey an expression of sympathy from the meeting to Mr. Garnett.* He was glad to be able to state that his personal health had improved.

New Member.

Mr. F. Durkin, Assistant Manager of the Southampton Gas Company, was unanimously elected a member of the Association, on the motion of the President, seconded by Mr. Davis.

Place of Next Meeting.

The President invited suggestions as to the place of next meeting. He said it occurred to him that Weymouth would be a suitable town; but Mr. Lowe could not get to the meeting, and therefore they did not know if this would be convenient. He suggested that, subject to Mr. Lowe's consent, the next meeting should be held at Weymouth, but that if it turned out that they could not go there, the selection of some other place be left to the Committee.

Mr. A. Thomas (Cowes) thought, in the event of Weymouth failing, they could go to Worthing.

Mr. Riley said he would propose that the President's suggestion be accepted.

Mr. Davis seconded the proposition, and it was carried.

The President then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—For the second time during the history of this Association, you have honoured me with the position of President. I accepted the responsibility with some diffidence, as I felt there were others who are more capable of fulfilling the requirements expected of one discharging the duties of such an important office. However, here I am; and as you on your part have to listen to what I may bring before you without comment, I will endeavour to interest you to the best of my ability.

Although the discharge of onerous duties at the various works under your care during the past rigorous winter have become history, I trust I may congratulate one and all on having come through the ordeal without mishaps worth recording; and most blessed was the man who had everything to hand for meeting the emergencies as they arose. As I am speaking to practical men, it would appear presumption on my part to think that you have not made mental and other notes of the weak places in your plant, that have to be made strong for future demands; but I do so, as human nature forgets the cloudy day when the sun shines out with new strength, driving away the winter darkness.

Be straight with your Directors or Committees as the case may be, and put before them the exact state of affairs, so that they may put you in a position to fight the electric light, oil, or anything else that "giveth light," but more especially to meet the yearly increase for the various purposes for which gas is now being used—viz., cooking, heating, motors, workshop appliances—yes, and even for killing people who like to blow out the light before they turn in for the night. But, of course, this ignorant use of gas does not obtain in this enlightened country. You have no right to be expected to watch till midnight to see if the gasholder will keep afloat, for want of storeage or of producing power, or that your purifying plant is squeezed into the smallest limits for doing its duty, or that your distributing plant is so wanting in calibre as almost to necessitate the use of an exhauster to keep up the pressure in the district; for be sure economy of the cheeseparing type will bring its reward in trouble. Then, on the other hand, when you have convinced your employers as to the necessity for extensions, see that the means granted are well and profitably laid out.

Like other towns, we have had an extraordinary demand on our resources; and it has been met, and the supply of gas well maintained. But it was a lively time, fighting the low temperature on the works and in the district. My Directors, however, know what they have to do to keep pace with the growing demand for gas; and extensions have been sanctioned with this object in view. I said in a former address that the profits were made in the retort-house. Well, I do not see any reason to alter that opinion; but this can only be done when Directors find the sinews of war. This I omitted to state; for if the capital did not build the retort-house, &c., where would profits come from?

In the face of the increased cost of coal, every economy of a right sort is needed; for it does not appear that prices will go back to the low figure—and, in my opinion, a too low figure—that obtained a few years since. It is satisfactory to know that the miners get some of the extra price paid; and I believe the general opinion to be that they should be fairly recouped for their hazardous duties. It is true that the enhanced price of raw material enables one to obtain a better price for coke. Just now tar is firmer; but, whether or not this continues, outside influences beyond the control of gas companies may rule the price of this product. Those of you who manufacture sulphate cannot look for much extra help in that direction. But as my Directors have determined not to give away their liquor, plant is being laid down for working it up; and although sulphate is down, we hope to get something out of it.

Against advantages obtained in one way, there is often a pull on the purse-strings in another—in the additional demand for wages, &c. You no doubt recollect that this town was the centre of attraction last autumn, during the dockers' strike, the fringe of which just reached the gas-works, as far as some outside men were concerned. But their requests had consideration; and the concession made by my Directors, after an interview with the men in my presence, was received in a very pleasing spirit. You are aware that we work under the eight-hour system in the retort-house; and from time to time concessions have been made to the stokers and yardmen, so that, on the whole, matters have gone on harmoniously. As the men are under the control of the manager, he should be the "buffer," so to speak, or intermediary between employer and employed; and it has been so here. I do not agree with the view that any institute of gasmen should be used for framing a general law on wages, as some propound. Every district has its own peculiarities, and must be dealt with distinctively. I do think, however, that strikes are a barbarous method of settling differences, and they often hit those who expect to get something by them. If boards of conciliation or arbitration could be formed when required, with this end in view, we might extend some help; but it would never do to set ourselves up in antagonism to men with whom we come into daily contact. Here I leave the question, which wiser heads than mine have not solved. But let both sides strive to act up to the command: "Do unto others as ye would be done unto."

I am afraid you will consider I have been traversing things in general, and giving you nothing personal. We have not gone in for the many tempting methods offered for improved carbonizing plant. I have seen some of them in operation, and the technical publications keep us posted up as to these matters. The survival of the fittest will be the one needed for our work.

I still adhere to the air process in purification, but consider the pure oxygen process to be something better; and I understand reliable data can be given to show its commercial and other advantages. For the encouragement of those who have

* This expression of feeling on the part of the members was called forth by the serious illness of Mrs. Garnett, which, as announced elsewhere, has since terminated fatally.—Ed. J. G. L.

refrained from going into the sale of broken coke, I would say, "try it," for I find we are doing a large and increasing business in this residual, and the more you can sell locally, the better for the companies you represent.

As to extending the use of gas in this town—well, without a great flourish of trumpets, something has been done. Prior to 1886 we had about 20 cooking-ranges out on hire. In that year we held an exhibition of gas appliances, with cookery demonstrations, which was much appreciated by the inhabitants, and brought up the number to 155. A gradual increase has taken place year by year. After an interval of time, we had cookery demonstrations in this room, which were well attended; and last year another successful exhibition, which was very satisfactory. At the present time we have upwards of 400 ranges out on hire. They are so much appreciated that users recommend their friends to adopt them. But the poor untrained domestic is our worst enemy; and no doubt, from what I hear, many consumers would start a range, only they are afraid of the gas bill. We have had for several years a sample-room in this building; and so good service has it rendered that my Directors have now determined to fit up the front basement (which I was desirous of having ready for your inspection, but you must take the will for the deed), and keep various appliances on view. If we can start a cookery class for servants, giving practical instruction in the use of gas for various purposes, a triple gain may accrue—first to the consumer, secondly to the servants, and thirdly to the Gas Company. Heating-stoves are sold right out at reduced prices, and a large number have been disposed of; these and cookers being charged cost price for fixing. I do not at present see my way clear to recommend my Directors to let heating-stoves out on hire, for which I have my reasons. You may buy your increase of business at a loss. A very sensible increase in day consumption has arisen, but bear in mind that in the winter increased day consumption means good storeage and extra producing power. My advice to those of you who have not commenced the hiring of cookers is not to "rush" the system on your consumers. No general rule will apply. You know your districts better than do the makers of apparatus, whose aim is to obtain large orders. You, however, have to bear the brunt of the battle if non-success attends your efforts; and it will be better to succeed gradually.

With regard to the gas-fitting business, we have only gone into this when specially called upon. I have recently fitted up the Volunteer Artillery Drill Hall and the Victoria Hall, with satisfactory results; and I frequently advise architects as to lighting arrangements.

Street lighting has received a good deal of attention; and by fixing improved lanterns, with powerful burners, for inspection, the Borough Surveyor has induced a more enlightened policy to be pursued by the lighting authorities, they having adopted them at the principal crossings. Within the two last years, a modification of Sugg's "Métropole" lamp has been fixed in some of the principal thoroughfares, with three burners used up to 11 p.m. when the midnight arrangement is turned on until morning. The general opinion is that a vast benefit has been conferred upon these parts of the town; and the proverbial shadow under which evildoers could shelter themselves, has so far disappeared. We hope to extend this system, as "our friend the enemy" is in our midst; and we trust he may be still the "light of the future"—for the sake, of course, of the poor ratepayer.

There is another matter which I notice is coming to the front—namely, the item, "Rent of meter." In some towns it "is not;" and in others it is on the wane. It may appear tender ground that I am treading upon; but, looked at from a practical point of view, one hindrance to extending the use of gas would disappear with the abolition of meter-rents. Consumers have a vague idea that having meters a little large for their requirements means a heavy gas bill; but it is often the charge for meter-rent they have in their minds. If a consumer overloads his meter—a thing which is continually being done—what remedy have you? I cannot find any Act relating to meters that will assist you very materially. I would suggest, if meter-rents are not abolished, that the amount should be reduced to some extent, and that three and five, ten and twenty lights, and so on should be grouped together, at the same rental. This would cut away the objection to the use of a proper sized meter; and the vague idea above referred to, would possibly disappear. I should like to throw out a hint to some member to take up the question in a paper for our autumn meeting; it being a subject which, with a good discussion, should produce beneficial results.

We are very much indebted to gentlemen outside gas-works for valuable contributions on gas manufacture and the chemistry of gas lighting. I may cite the Cantor Lectures on "Gaseous Illuminants," given before the Society of Arts towards the end of last year by Professor Vivian B. Lewes,* as an example; and I will add that they will well repay your study.

In conclusion, I have to thank you for your kind attention to one who is fully aware of his own short-comings in building up an address; and I can only trust they will be hidden under the practical papers to be read to-day, on which I hope there will be good discussions.

A vote of thanks was unanimously accorded to the President for his address.

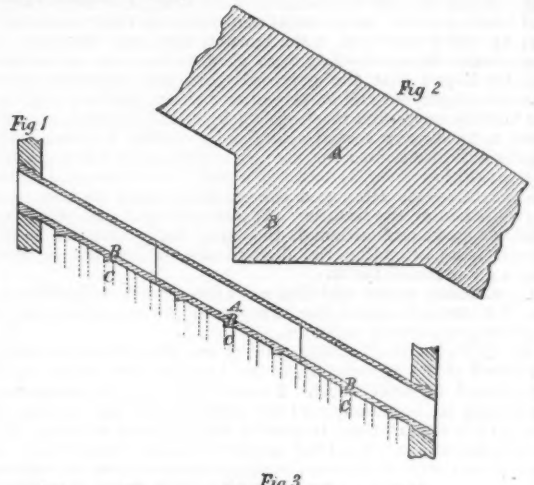
(To be continued.)

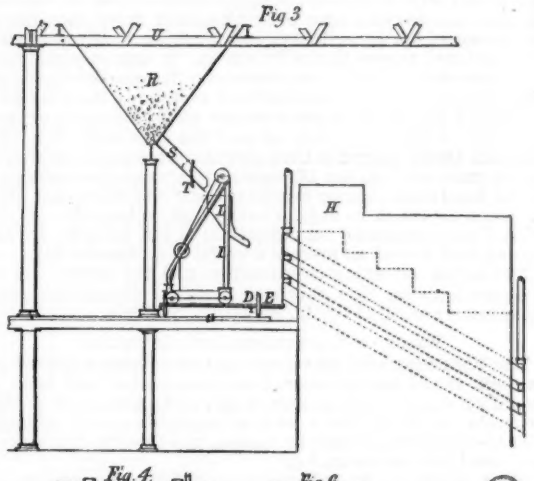
* See JOURNAL, Vol. LVI., pp. 1140, 1194, 1240, 1288, 1334.

REGISTER OF PATENTS.

The Construction of, and Apparatus for Charging, Inclined Gas-Retorts.—Hunt, Charles, of Birmingham. No. 5078; April 1, 1890. [8d.]

The object of this invention is two-fold: To prevent any tendency on the part of inclined retorts to slide upon their bearings, and to charge them with facility.





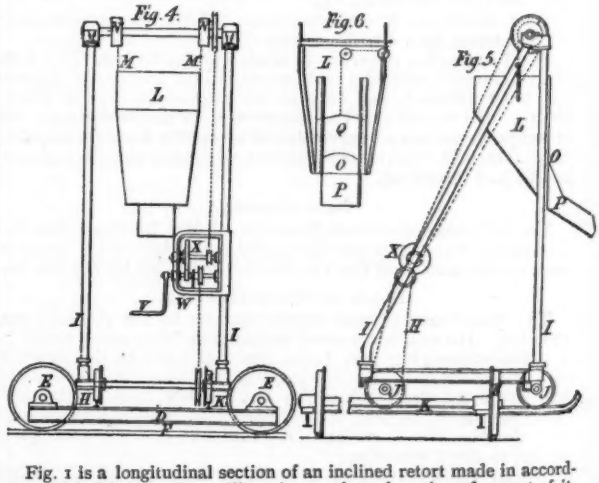


Fig. 1 is a longitudinal section of an inclined retort made in accordance with this invention. Fig. 2 is an enlarged section of a part of it, with its appropriate snug. Fig. 3 is a transverse section of part of a retort-house, with inclined retorts and stationary coal trough or hopper, together with the travelling apparatus for charging the retorts. Fig. 4 is a front view (drawn to a larger scale) of the charging apparatus. Fig. 5 is a side view. Fig. 6 shows the hopper facing the retorts.

The patentee proposes to mould or form on either or both of the upper and lower exterior surfaces of the retorts A, snugs B so shaped and placed as to take a vertical bearing upon the walls C supporting them, and convert a side thrust or strain into a vertical one; while upon the upper snugs the cross walls may be built and supported.

To carry out the second object of the invention, the inventor arranges a horizontal iron framework or platform D (figs. 3, 4, and 5) mounted upon wheels E, and suitable for running upon a rail F, or tramway laid longitudinally on the floor or stage G, in front of the retort-benches H. On this framework is erected another framework I, rectangular in front

elevation and plan, but of a right-angled triangular form in side elevation—the vertical side being next the retort-benches. The framework is mounted upon wheels J, so that it may be moved forward or backward upon rails K on the platform D, and at right angles to the benches. Between the uprights of this framework, there is a hopper L suspended by chains M, which pass over pulleys N, attached at or near the top of the framework, and therefore capable of being raised or lowered to any requisite height; guides being provided to ensure the rising and falling being uniform. The hopper has an opening O (figs. 5 and 6), and is furnished with a shoot P of suitable size and form for entering the mouthpiece of the retort. The opening is provided with a door Q, which may either slide up and down (as in fig. 6) or be hinged to the hopper. The door, if hinged, is opened or closed by a lever placed within easy reach of the attendant; and the hopper is placed at such an angle as to give proper impetus to the coal when charging the retort. The hopper receives its coal from a trough or continuous hopper R furnished with shoots S, having doors opened or closed by levers T. These are placed at convenient intervals through the retort-house, above the hopper first mentioned, and supported by transverse girders U.

The moveable hopper L being supplied with coal from the trough R, all that is necessary to charge the retort is to wheel the platform D up to the retort, and adjust the height of the hopper so that the shoot may enter the mouthpiece, when, upon operating the lever or chain attached to the door, it will be opened, and the coal fall into the retort. The coals having been delivered to the retort, the shoot may then be withdrawn; the platform moved onwards; and the retort closed.

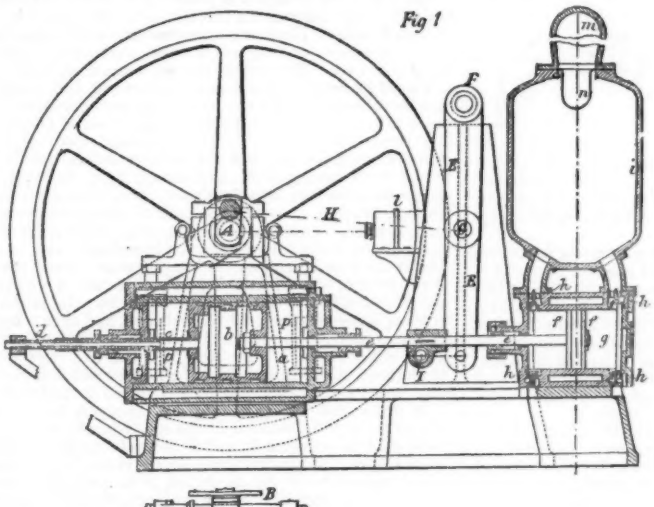
The adjustment of the shoot to the right position for entering the mouthpiece of the retort is effected through a winch-handle V, which gives motion to a pinion W and spur-wheel X. When the pinion is in gear with the spur-wheel, the chain-pulley shown will be made to revolve, and through the chain will cause another pulley to revolve also, thus winding up or down the chains M, and so raising or lowering the hopper L. By means of a lever, the pinion W may be thrown out of gear with the wheel X, and at the same time a clutch is caused to engage with a third pulley. The chain of this pulley passes under a pulley fixed upon the same spindle as the railway-wheels J, so that, when the winch V is turned, the frame is made to advance to, or recede from, the retorts as desired.

Gas-Engines.—Baxter, S.; communicated from L. J. R. Holst, of Paris. No. 5005; March 31, 1890. [11d.]

The essential character of the engine forming the subject of this invention is the replacing of the explosion of the gaseous mixture effected in advance in the cylinder, by a gradual combustion of a non-explosive gas or gaseous mixture introduced into the cylinder in proportion to the displacement of the piston during the period of admission, in such a way as to create a constant pressure during the admission period, as in the case of steam-engines.

Fig. 1 is a vertical longitudinal section of such a gas-engine. Fig. 2 is a plan. Fig. 3 is an end view of the motor, partly in section.

Fig 1



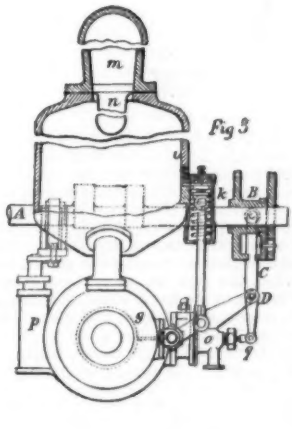
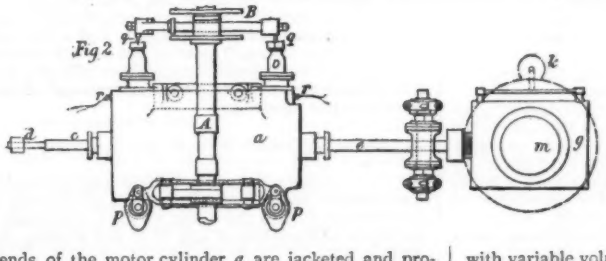


Fig 3

Fig 2



The sides and ends of the motor cylinder *a* are jacketed and provided with water circulation. The piston *b* is hollow, and has a length preferably about equal to the length of stroke, so as to diminish the gas-heating surface of the sides of the cylinder. To diminish still further this heating action, an arrangement is adopted whereby the interior of the piston is placed in constant communication with the outer air. For this purpose, the back face of the piston is provided with a hollow rod *c*, sliding freely upon another hollow rod *d*, fixed in a support by its exterior end, as at fig. 1. The piston-rod proper *e* carries at its end the piston *f* of the air-pump, consisting of a cylinder *g* (also double-jacketed) and inlet and discharge valves *h*. The air is forced into a reservoir *i*, in which it is stored at a determined and constant pressure; and to prevent this pressure from exceeding the fixed limit, the valves (the play of which entails a loss of work) are replaced by the regulating arrangement represented in fig. 3.

This consists of a small cylinder *k* communicating with the reservoir *i*, and within which works a piston with counteracting spring, the tension of which is regulated according to the maximum pressure to be maintained within the reservoir *i*. The piston is connected by a link and an arm with a tube placed at the exterior of the cylinder *g*, and of which the two extremities are furnished with openings which can be in communication with the two ends of the cylinder. When the pressure in the reservoir *i*, and consequently in the small cylinder *k*, exceeds the limit for which the spring is regulated, the piston descends, causes the tube to turn, and thus puts in communication the two faces of the piston *f*, so as to suppress all work of compression by the pump *g*.

The gas is compressed by means of a small pump *l* into a chamber *m*, located above the reservoir *i*, and separated therefrom by a flexible membrane *n* mounted in such a way as to fall nominally into the reservoir *i*. This membrane has for its object to regulate automatically the pressure of the gas and air, which should always be the same in the two reservoirs *i* and *m*.

The distribution comprises two admission-valves *o*, and two escape-valves *p*. The admission is operated from the motive shaft A by the intervention of the cam B and lever C oscillating on a fixed axis D, which actuates the distribution-rod *q* of each side of the cylinder (see fig. 3). The air from the reservoir *i*, and the gas from the reservoir *m*, are mixed before entrance into the motor cylinder; and finally this admission has its orifices so arranged as to send at each stroke of the piston a current of compressed air into the cylinder, in order to drive out therefrom the residues of combustion. For this purpose, the orifices S for the passage of the air, are uncovered an instant before those for the admission of the gas, and just at the moment when the motor piston has nearly arrived at the end of its stroke. At this precise moment, the escape orifices *p* are still open; in fact, they close simultaneously with the opening of the passage for the gas in the distribution.

Figs. 1, 2, and 3 show the escape-operating mechanism, by means of a cam and cross-bar connecting the two valves by levers on the axes thereof. The motive force is transmitted to the horizontal shaft A by a swing-lever E, of which the fixed point of oscillation is at F, and which is connected at G with the connecting-rod H. A block I fixed on the rod *e*, and a short connecting-rod, serve to connect the piston-rod *e* with the lower end of the swing-lever E.

The lighting of the mixture in the cylinder is effected by means of the electric wires *r*; and the engine can be started without the necessity for turning the fly-wheel by hand.

By the invention, the patentee claims to avoid the shocks resulting from the usual explosion, and causing a loss of force at the same time as a very sensible fatigue of the parts of the mechanism. Also he reduces the prejudicial space, and obtains a diagram approaching very closely to the theoretic surface. Finally, the elevation of temperature with variable volume and constant pressure is less than when there is a variable pressure and constant volume. In effect, he says, as all the caloric cannot, from different causes, be utilized—such, amongst others, as the heating of the sides of the cylinder—the invention enables him to transform a portion of this caloric into work; and the temperature remaining less elevated, there is less loss by artificial cooling. This mode of application, to the production of motive power, of the heat developed by the combustion of a non-exploding gas or gaseous mixture, presents numerous advantages, which cause the motor to participate in some of the characteristics of a gas-engine and of a steam-engine "without having the inconveniences of either."

Charging and Discharging Gas-Retorts.—Woodhouse, S. J., of Leeds. No. 5163; April 3, 1890. [8d.]

This invention consists, in the first place, of a long scoop or charger formed in two halves, so connected that, when the under sides of the two halves are brought together, the scoop forms a long trough open at the top, and capable of holding at once the full charge of coal for one-half a through retort. The two halves of the scoop are connected along the edges of the under sides by pins and eye-pieces; the former being fixed on a long sliding-rod attached to the one half, and the latter being attached to the other half of the scoop. The two halves can be unlocked by moving the sliding-rod, which motion draws the pins out of the eye-pieces. By an arrangement of pinion, gear-wheels, and racks, the two halves of the scoop can then be opened out away from each other; allowing the coal contained in the scoop to drop out evenly on to the bottom of the retort, and without packing or cramming. Lifting mechanism for the scoop when full is supported from a radial swinging arm attached to one of the buckstaves or cast-iron brackets employed for tying the brickwork of the retort chamber together, or from longitudinal guides or supports running along in front of the retorts. Such mechanism consists of a rack and pinion arrangement, differential pulley blocks, or a screw and nut arrangement. In the case of small plant, there is a carriage or barrow, to which the above mechanism is attached, so as to make it portable and capable of being moved from one set of retorts to another. In order to facilitate the running in and withdrawal of the scoop into and from the retorts, the scoop is provided with two or more pair of runners; and for the purpose of withdrawing the charge, there is a long rake or drag provided with prongs, and having attached at its far end a rectangular hinged flap or scraper. The former serve to pull out the main body of the coke; while the latter withdraws the smaller loose pieces, which would otherwise be left behind. By this arrangement the retort is emptied at one draw. The underside of the rake is provided with a linked rod or chain, which engages with a chain-wheel at the front (outside the retort); such wheel when rotated by suitable mechanism, giving the necessary purchase or draw for pulling out coke without any strain upon the plant.

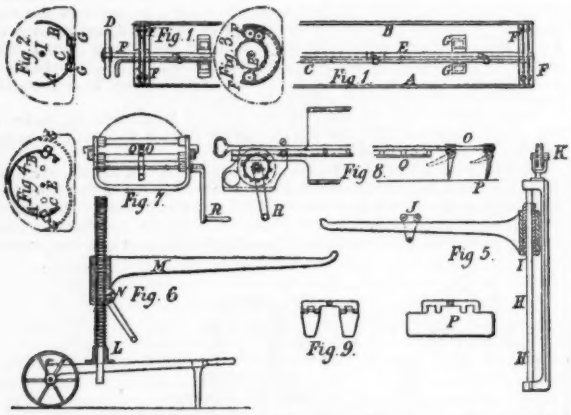


Fig. 1 is a plan looking down on the top of the scoop when closed for carrying the coal; fig. 2, a cross section; and fig. 3, a section showing the rack and pinion arrangement for opening out the scoop to discharge it. Fig. 4 is a cross section corresponding to fig. 2, in which the scoop is shown opened out to discharge the coal.

The two halves of the scoop A B are connected as previously described by means of pins attached to the sliding-rod C and eye-pieces, and are locked and unlocked by moving the sliding-rod in one direction or the other. When the two halves are unlocked, they can be opened out apart, by means of the hand-wheel D, rotating the rod E, and actuating the pinion, intermediate wheel, and gear-wheels F, which latter actuate the toothed racks fixed to the sides of the scoop. The rod E passes through to the far-end of the scoop, where a similar set of wheels and racks are provided. In some cases it may be preferable to hinge the two halves of the scoop about two separate axes (see fig. 4).

Instead of the gear-wheel and rack arrangement, the wheels F and racks may be replaced by drum and chain arrangement; one end of the chain being attached to the drum, and the other to the bottom edge of one of the halves of the scoop. Circular sheet-iron ends protect the gearing from small coal, dust, &c. Three pairs of runners G serve to facilitate the running in and withdrawal of the scoop to and from the retort.

Figs. 5 and 6 show two arrangements for lifting the loaded scoop, intended chiefly for small or moderate-sized gas plants.

In fig. 5, one of the buckstaves of the retort chambers is shown carrying a vertical shaft H in two brackets. A sliding shoe I is fitted over the shaft; and on it rests the socket of a radial swinging arm provided with a traversing carriage J, to which the link chains from the scoop are attached. A balance-wheel K is mounted on the top of the buckstave, and round it is passed a rope or chain attached at the one end of the shoe I, and carrying at the other end a balance-weight. Or, more preferably, the shoe is attached to a differential pulley-arrangement mounted on the buckstave in place of the wheel.

In fig. 6 the carriage or barrow before mentioned is shown. On this is mounted a socket L carrying a circular rack pillar. The radial arm M is furnished with a large socket piece, which fits over the outside of the rack pillar, and is provided at N with a pinion, fitted to gear with the teeth of the rack pillar, and rotatable by means of a handle. A pawl is arranged to engage either with the pinion or rack teeth, so as to hold the radial arm at any desired height. The carriage or barrow is run up near to the retort which has to be drawn and charged, with the wheel next to the retort chamber; and the barrow is made fast to the mouthpiece of one of the adjoining retorts by means of short links or chains passed over hooks on the barrow frame just above the axle.

Fig. 7 is a front end view, and fig. 8 a (broken) longitudinal section illustrating the mechanism for withdrawing the coke. O is the long rake or drag provided with two prongs (see also fig. 9), hinged so as to give way and lift when being introduced into the retort (see dotted lines fig. 8), but incapable of being moved beyond the vertical in the opposite direction; and P is the scraper mounted at the end of the drag in a similar manner. Q is the link rod rivetted to the drag, with which the chain or toothed wheel at the front of the retort engages. This wheel is rotated directly by the handle R, or by means of a set of gear-wheels. There are two steadying or guide rollers for supporting the drag rod O so as to engage with the wheel.

Cooling and Conveying away Coke Discharged from Gas-Retorts.—Waller, G., of Park Street, S.E. No. 5194; April 3, 1890. [8d.]

This invention has for its object the construction of apparatus for cooling and conveying coke when discharged from gas-retorts into suitable receptacles or places; thereby reducing much of the labour incidental to such work as ordinarily carried on.

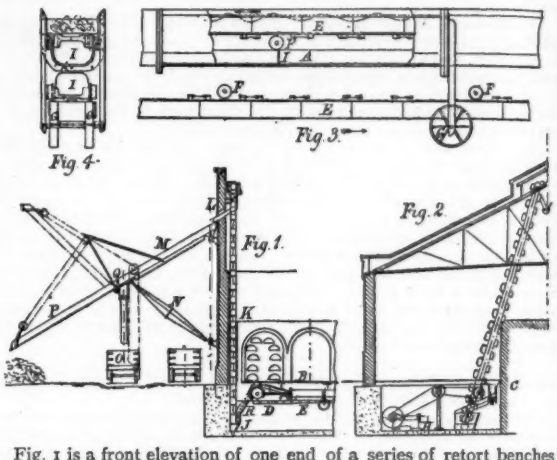


Fig. 1 is a front elevation of one end of a series of retort benches; showing the conveyor, elevator, and shoots. Fig. 2 is a view of the elevator taken at right angles to fig. 1; showing an arrangement of gas-engine for giving motion to the machinery. Fig. 3 (drawn to a larger scale) shows the conveying trough A; some parts of the outer plates being removed in order to see the conveyor inside. Fig. 4 is a cross section of fig. 3; exhibiting the trough and conveyor also.

The top of the trough A is placed at or below the level of the retort-house floor B, and extends the whole length of the bench of retorts. If placed below, there are openings in the floor leading to shoots C (fig. 2), the lower ends of which terminate in or just above the trough. Near each end of the trough, there is a drum D, round which an endless band E, composed of metallic plates and links, supported at intervals on rollers F (which run on projections within the trough) and G, is made to revolve; motion being imparted to one of the drums by suitable power—as a gas-engine H. The band and trough constitute the conveyor proper; although the elevator and further shoots may be said to be a continuation of it. The trough is supplied with water; so that, as the hot coke falls into the shoots upon the endless band, it is cooled. Sweeps, brushes, or scrapers I, may be placed on the underside of the endless band, to remove breeze from the bottom of the trough. Instead of the endless band, an Archimedian screw or spiral, working within the trough, may be used to propel or convey the coke to one end of the trough, when it falls by a shoot R into a chamber J. In this chamber one part of an elevator K is placed; the upper part of it being at some distance above the retort-bench, and over a hopper or shoot L attached thereto. From the hopper descends a shoot M, capable of being adjusted laterally by being pivoted to a support N, like the jib of a crane. Coke thrown into the hopper will fall down the shoot M into trucks O (or other receptacles) placed to receive it.

In order that the coke may be conveyed beyond the trucks and placed at, say, the exterior of the retort-house, the shoot M is made in two principal portions, M and P, hinged together at appropriate parts of its length. When the lower part P is not in use, the outer extremity of it is raised, as shown in dotted lines; and the coke falls into the trucks O as described. But when used, the attendant pulls a lever, and the outer extremity of it is depressed; and at the same time, by means of a toothed quadrant Q gearing into a rack attached to a slide, the orifice down which the coke would have fallen to the trucks is closed. A reversal of the action raises the extreme end of the shoot, and opens the orifice just alluded to.

Gas Motor Engines.—Otto, N. A., of Cologne. No. 6113; April 22, 1890. [8d.]

This invention relates to gas motor engines working with a cycle of four strokes; and it has for its object to dispense with the counter-shaft driven at half the speed of the engine-shaft such as is usually employed with engines of this kind for working the valve and other gear.

For this purpose, the valve for admitting the combustible mixture of gas and air is made automatic—that is to say, it is held closed by a spring of such strength as to allow the valve to be opened by the pressure of the atmosphere when the piston performs its suction out-stroke. The discharge-valve, on the other hand, is opened at the end of the working outstroke by an apparatus such as a small cylinder with a piston subject to the pressure existing in the engine cylinder towards the end of the working-stroke; and the valve is held open during the expelling-stroke, and is then made to close, either by maintaining the pressure in the small cylinder during that time, and then allowing the pressure to escape, or by providing a locking device

which holds the valve in the open position, and which is afterwards made to release the valve. Or again, the valve may be connected to a cataract or other similar device, which controls the motion of the valve so that it does not close before the end of the working-stroke. In combination with these arrangements, there are also employed devices whereby, when the engine runs too fast, either the igniting device is controlled so as to prevent the ignition of the explosive charge at the end of the compression-stroke, so that the charge is allowed to expand again during the following outstroke, and is then again compressed, and so on, until the speed of the engine is again reduced to the normal; or the locking device of the discharge-valve is actuated by means of a reciprocating-rod, which frees the valve from the locking device at the end of each expelling-stroke, when the engine is running at normal speed, but which is acted upon by a governor, so as to prevent it from freeing the valve when the engine is running too fast. In the latter case the discharge-valve remains open during the following suction-stroke, and thus causes the expelled combustion gases to be drawn back into the cylinder and expelled again, until the speed of the engine is reduced.

Gas-Engines.—Bickerton, H. N., of Ashton-under-Lyne. No. 227; Jan. 6, 1891. [6d.]

The object of this invention is to provide means for reducing the noise caused by the intake of air to, and the exhaust gases from, gas-engines. This is effected by providing at the intake orifice of the engine, leading to the suction pump or valve, a block of metal with a number of passages pierced through it—by preference, of taper form, having the smaller openings on the inside. On the outside of this block, and in continuation of the passages, there are pipes connected, one to each of the holes or openings, and, by preference, arranged in a pendant position. In a similar manner, at the end of the exhaust-pipe, a box (or block, as the case may be) is provided, in connection therewith, and a number of projecting pipes or small tubes are attached thereto, from which the exhaust gases finally escape. Upon the engine drawing in air, the current is broken up into a number of small channels by means of the tubes; and the current of exhaust gases is broken up on exit, in a similar manner. By this means much reduction in the noise of a gas-engine is said to be effected.

APPLICATIONS FOR LETTERS PATENT.

4212.—Browne, F. L., "A new or improved apparatus for utilizing ordinary illuminating gas for heating purposes." March 9.

4222.—Lanchester, F. W., "Improvements in gas-engines." March 10.

4229.—Hirsch, R., "A process and apparatus for the separation of mixtures of gases." March 10.

4230.—Lanchester, F. W., "Improvements in gas-engine starting arrangements." March 10.

4279.—Claus, C. F., "Improvements in the purification of water gas or other producer gas from sulphur compounds." March 10.

4311.—Claus, C. F., "Improvements relating to the manufacture of the aluminates, sulphates, and carbonates of soda and potash, and to the production or recovery of alumina and other bye-products." March 10.

4355.—Campbell, H., "Improvements in gas-engines." March 11.

4500.—Jones, F. J., "Improvements in gas-purifiers." March 13.

4535.—Griffin, S., "Improvements in governing gas motor engines, and in connection therewith." March 13.

4567.—Williamson, T., "Improvements in the application of water gas to steel melting and other gas heating furnaces." March 14.

4573.—Wigham, J. R., "Improvements in illuminating lighthouses, beacons, harbours, lightships, and places where strong and variable lights are required." March 14.

New Joint Stock Companies.—The Northern Companies Hydro-Oxygen Gas Company, Limited, has been formed with a capital of £60,000, in £10 shares, to carry into effect two agreements—one made between the Hydro-Oxygen Gas Patents Proprietary, Limited, and Malcolm Guthrie, and the other between James Falconer and Malcolm Guthrie, for the acquisition of rights in respect of inventions for the production of oxygen and certain gases and gaseous mixtures. A Company has been formed, under the title of James White and Co., Limited, to acquire the business of James White and Frederick Pollock Webster, fire-brick and fire-clay manufacturers, of Brassington, Derby. The Canonley Club Row Water Company, Limited, has been formed, with a capital of £250, in £1 shares, to carry on the business of a water company. The firm of Messrs. Louis Demuth and Co., tar and ammonia distillers, alkali makers, and manufacturers of chemical products, has been converted into a limited liability Company, with a capital of £150,000, in £10 shares.

Scraping a Water-Main at Newport (Mon.).—A short time ago, one of Messrs. Glenfield's patent water-main scrapers was successfully employed to clear a corroded main at Newport (Mon.). Trouble has been experienced for some time from the formation of fungi and other deleterious growths in the pipes, which have caused the water to give off an offensive odour. With the view of getting rid of this, the Water Committee of the Corporation some time since determined to test the appliance mentioned above, which in shape bears some resemblance to a torpedo, having a steel scraper in front, and a propelling piston behind. It was accordingly tried on a 10-inch main. The scraper was inserted at an opening in the pipe, and started on its journey. As it proceeded along, it tore away all the corrosion and sediment it met with and deposited them and itself in a box at the end of the length of pipe under operation. It was expected that the propeller would travel at about as rapid a rate through the main as a person might reasonably walk. But by the use of sounding instruments employed on the way, it was discovered that the speed was much faster; indeed, those present at the experiments were obliged to run in order to keep up with the scraper. Considerable astonishment was evinced at the quantity of corrosion removed; and the Manager of the Water-Works (Mr. C. Cullum), as well as the Inspector (Mr. F. W. Houghton), pronounced the trial to have been in every way successful.

CORRESPONDENCE.

[We are not responsible for opinions expressed by correspondents.]

Rating Committees and "Tenant's Working Capital."

Sir,—May I be permitted to offer a reply to the letter of your correspondent "Secretary" on this subject in your last issue? He says: "It is contended on behalf of gas companies that the following should be allowed: (1) Working expenses—five months' expenditure; (2) meters on hire; (3) sundry stores, tools, and laboratory apparatus; (4) six weeks' stock of coal, calculated on the maximum daily consumption; (5) one quarter's rent. But overseers (? committees) will not allow items Nos. 3, 4, and 5; they say they are included in the first item." About the five months' expenditure, there will not be a question; that is the usual allowance. Sundry stores are the stores in stock; and therefore (if the system of bookkeeping is the right one) not included under any head of expenditure in the revenue account. Tools and laboratory apparatus are chattels, and would have either to be provided or taken over by the tenant. Obviously the stock of coal is not included in the five months' expenditure, because the five months' coal has all been used, and the stock provided in addition. The argument employed against claiming the quarter's rent under tenant's capital is that a landlord, knowing that if the tenant were required to pay the rent at quarter-day, and that he would have to provide capital for that purpose on which he would charge the usual percentage, would not press for his rent at quarter-day, but would let its payment lie over until the tenant had funds in hand from the collection of the gas-rental. The question, however, is not what a generous landlord or an astute landlord would be inclined to do, but what the eventualities are for which a tenant would be bound to provide. The rent due at quarter-day is one of those eventualities.

None of these matters has ever come before the High Court, on appeal, for decision by the Judges; but Courts of Quarter Sessions have, at one time or another, allowed all or most of the items. It would be well if an authoritative legal decision could be obtained on the different points.

Referring to your report of the South Metropolitan Gas Company's appeal, the eminent and learned Counsel who conducted the case for the respondent Union was clearly under a misapprehension in supposing that I had included in the revenue expenditure the £70,607 for repairs and maintenance. I did nothing of the kind, as will be seen on reference to my computation, where it is shown as a statutory deduction. What I claim is that the tenant, having, from the necessity of the case, to execute the ordinary and every-day recurring repairs, and consequently being obliged to provide funds for that purpose, is entitled to 17½ per cent. on five-twelfths of the amount. That is the common-sense view which will scarcely be disputed.

Thos. Newbigging.

Manchester, March 19, 1891.

Recent Appeals to the Chief Gas Examiner.

Sir,—The Chief Gas Examiner, as reported in your last issue, makes the following comment on this Company withdrawing an appeal after they had contended, in the most emphatic manner, that the gas was fully up to the standard: "It appears to me to be the most dignified and proper course for them to adopt when they fail to find evidence that the defect in the gas was occasioned by an unavoidable cause or accident." On this I would make the further comment—as we were satisfied there was no defect—that it is not possible to find an unavoidable cause or accident for a defect which does not exist. No matter what evidence may be produced to show that the gas was up to the standard, if the official tester has taken his test in the prescribed manner, the Chief Gas Examiner assumes that the official test is correct, and disallows the appeal.

The plain truth is that the greatest dissatisfaction exists with the action, or want of action, of the Chief Gas Examiner. Consequently, the conclusion is being forced upon us that the only dignified course is not to appeal against adverse tests.

George Livesey.

South Metropolitan Gas Company,
709A, Old Kent Road, S.E., March 20, 1891.

The Oil Lighting Experiment at Erith.

Sir,—Your numerous readers in the provinces take a deep interest in the trial of public lighting by oil at Erith, and from time to time read with avidity the references thereto in the Journal; and as the experiment has now been tried for nearly three years, allow me to revert to its most recent phase. One fact is worth more than a thousand opinions; and the one fact I wish to record is that a 3-burner lamp, belonging to the West Kent Gas Company, has been reinstated at the Fountain at Belvedere, at a very dangerous crossing at the junction of five roads, and was lighted up with gas on the 11th inst. under a new agreement entered into with the Erith Local Board. The oil-lamp at this spot so often failed, that complaint was loud and continuous. The Oil Company tried their double best to keep it going, and stuck tenaciously to the column; but at length, after repeated failures, they have given up the contest, and gas has taken the place of the oil. I think, therefore, that this fact fully proves that oil lighting at this dangerous point has not been a success.

The other fact I wish to record is that the Erith Local Board report 1142 lamps not alight or "gone out" between the 21st of October, 1890, and Jan. 21, 1891; and this Mr. Defries, according to the printed report of the Board's proceedings, acknowledges to be quite correct. That is to say, the quarter's contract amounted to £165; the fines for the 1142 lamps out, to £142 15s.; and a cheque for the balance of £22 5s. was handed over. As a legitimate subject for public comment, surely, making all due allowance for the severe weather, this cannot be reasonably regarded as a success.

However, be that as it may, the Erith Local Board have applied to the West Kent Gas Company for terms for lighting the district again with gas, wherever the Company have mains; and we shall see, later on, whether any further attempt at experimenting with oil will be

made after the three years' contract has expired. The rise in the price of coal at the pit's mouth almost precludes the Company from making the same liberal offer that was made before the experiment commenced; but there is every desire on their part to meet the Local Board, consistently with the interests of the shareholders. One thing is quite certain, the Chairman of the Local Board, the original champion of oil lighting, has "had quite enough of it." It is an open secret that the Clerk to the Local Board has had "more than quite enough of it;" and it rests with the Lighting Committee to divise a way out of this difficulty. The wiseacres of the district have awoke to the fact that the Gas Company do not depend upon public lamps for their profits. The Company have paid their dividends as usual; and they and their consumers have never been upon better terms than they are at this day. Therefore, as in one of my early letters, so now again, allow me to say to my friends in the provinces, "Nil Desperandum!"

I may add that in addition to the 1142 lamps in evidence "not alight," our friends should add the "smoky doubtfuls." I leave them to determine whether in that district darkness or light has predominated; whether the advocates of public lighting by oil are to be regarded as "men of light and leading," or be relegated to the period of the dark ages; and whether they have been a Lighting Committee or a Committee on Darkness?

R. P. KEYS.

March 20, 1891.

Mr. Dexter's Paper at the South-West Association Meeting.

SIR,—In view of the paragraph in the notice of the South-West of England Association meeting in your last issue, referring to my stopping the publication of the abbreviated report of my paper, prepared by Mr. Humphrys, I think it desirable, in justice to that gentleman, to give some explanation. I was under the impression that the abbreviated report was to be published in the JOURNAL *in lieu* of the paper itself; and I only wished it to be stopped in favour of a complete report, provided the latter would not otherwise be given in some subsequent issue. But you misunderstood me.

Personally, I am just as pleased that the mistake has occurred, as I consider that the abbreviated reports, besides giving a great deal of unnecessary trouble to the Secretary to prepare, have, in certain cases, a mischievous effect—in this way: Anyone accustomed to reading a number of different technical journals weekly, as I am myself, is very liable, in reading through an abstract of a paper, to be impressed with certain phrases and ideas connected with the subject, which occurring to the mind some few weeks afterwards, when the paper is published *in extenso*, gives the impression that it has already been read, somewhere before, and is therefore passed over for something fresh; and, consequently, as likely as not, a great deal of interesting detail, purposely left out of the summary, is never heard of. My views of this matter are given thus shortly simply to indicate that I dislike the system itself, and am very far from wishing that the slightest reflection should attach to Mr. Humphrys' work, and his feelings hurt thereby.

FREDK. G. DEXTER.

Winchester, March 20, 1891.

The Shipment of Creosote Oil to America.—A correspondent writes: "In the market reports recently, mention has been made of large quantities of creosote oil being shipped to America. Can any of your readers say for what purpose this is used there? It appears like carrying coals to Newcastle, sending these crude oils to America."

The Water Supply of Stainland.—Some time ago the Stainland Local Board propounded a scheme of water supply known as the Coldacre scheme; and they obtained the authority of the Local Government Board to proceed with it. As soon, however, as the contractor commenced operations, the work was stopped by an injunction being applied for in the Law Courts by an adjoining property-owner to restrain the Board from appropriating the water running from the Coldacre Springs, which it was proposed to impound. The matter is now before the Courts; and, it is said, will not come on for hearing before May. Meanwhile the residents in the district are practically without any source of water supply, except from wells and pumps. At the last meeting of the Board, the Chairman (Mr. J. Quarmby) stated that, in view of the pressing requirements of the district, he had made a temporary arrangement for a supply of water from a quarry situated at Sowood.

Electric Lighting for Portsmouth.—Last session the Portsmouth Town Council obtained a Provisional Order investing them with powers to light the borough by electricity; and a short time ago they set the Electric Lighting Committee to work to consider the question of introducing the light. Their first step was to consult Mr. J. N. Shoolbred, who recommended them to visit Bradford, to inspect the low-tension system which had been installed there under his directions. Five of the members paid the borough a visit, and returned very favourably impressed with all they saw and heard, with the result that the Committee recommended, at the last meeting of the Council, that the electric lighting of the borough be carried out by the Corporation, and that Mr. Shoolbred be engaged to prepare plans and specifications. In moving the adoption of the report, Mr. G. Ellis stated that the cost of the electric light would virtually be 4s. 6d. as against the present price of gas. Mr. S. Foster seconded the motion. He admitted that for many years to come they might work at a loss; but they would have the satisfaction of knowing that they had the matter in their own hands. At Bradford the loss in the first half year was £1079; in the second, £732; in the third, £315; and now the profit was £17. Mr. Ward suggested that the Committee should engage Mr. Shoolbred to visit the places where the electric light would be supplied, and to furnish a report as to the probable cost; and he proposed that as an amendment. This having been seconded, Alderman Blake expressed the opinion that it would be hard to throw over a report of a Committee who had devoted so much time and attention to the subject; and he suggested that it should be altered to meet the views of the mover and seconder of the resolution. This was done; and the amendment was then carried unanimously—the alteration providing for the bringing up of a report as proposed.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Private Bills last week:—

Bills reported: Dundee Water Bill; Lynton Water Bill [preamble not proved].

Bills read the third time and passed: Bristol Gas Bill; Filey Water and Gas Bill; Newark Corporation Bill; Malvern Water Bill; Troon Water Bill.

HOUSE OF COMMONS.

Monday, March 16.

THE QUALITY OF THE LONDON WATER SUPPLY IN FEBRUARY.

Mr. LENG asked the President of the Local Government Board if he had seen Professor Frankland's report stating that during the month of February the water abstracted from the Thames by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies was in all cases of very inferior quality—being polluted by an abnormal amount of vegetable organic matter; that supplied by the Grand Junction Water Company on the 5th of February surpassing in respect of organic impurity any sample of Thames water examined by Professor Frankland during the last quarter of a century, being opalescent from imperfect filtration and not in a fit state for dietetic use. He also asked if the President had further observed that Dr. Koch's process of examination applied to the water supplied in the different Metropolitan districts showed the existence of microbes in the respective ratios of: Kent, 20; New River, 74; West Middlesex, 104; Chelsea, 144; Grand Junction, 220; East London, 248; Lambeth, 284; and Southwark, 356; further, if the reports from the officers of health showed that there was any correspondence between the condition of the water supplied and the amount of sickness in those districts, and also, if the existence of microbes in water for drinking and culinary purposes was found to be pernicious and injurious to the public health, the medical officers of the Local Government Board were able to recommend any effectual method either of extracting or counteracting them.

Mr. RITCHIE: My attention has been drawn to the report to which the honourable member alludes. With regard to the analysis of the water supplied by the Grand Junction Water Company on the 5th of February, I recently stated the facts very fully in reply to a question of the honourable member for the Knutsford division of Cheshire (the Hon. A. de Tatton Egerton). As to the analysis of the water supplied at a later date in the same month by other Metropolitan Water Companies, I have no doubt that the abnormal amount of vegetable matter, although much less than was the case with the water from the Grand Junction Water Company on the 5th of February, was occasioned by similar causes. Dr. Frankland informs me that the exceptionally impure condition of the river-derived waters supplied to the Metropolis in February has now passed away, and that these waters have apparently returned to a condition approaching the normal at this season. I have communicated with Dr. Frankland with regard to his statements as to the existence of microbes. He says that the number was not large for filtered river water; and that, as no pathogenic organism was observed among the microbes, their presence does not afford any ground for alarm. The Board have not received any report from medical officers of health showing that there is any such correspondence as is suggested in the question.

Wednesday, March 18.

THE COMMITTEE ON THE METROPOLITAN WATER BILLS.

Mr. RITCHIE moved that Mr. T. H. Bolton, Sir A. Borthwick, Mr. Bristowe, Mr. Lawson, and Mr. Murdoch be members of the Select Committee on the London Water Commission Bill; and that four members be added by the Committee of Selection.

Sir J. LUBBOCK remarked that the proposed names had only appeared upon the paper that morning. Of course, he had no objection to any of the names in themselves—all the honourable members proposed being well qualified; but it would not follow that the composition of the Committee was satisfactory. No doubt the views of the London County Council would be ably represented; but though he did not wish to oppose the motion, or take the somewhat invidious course of suggesting a change of names, he regretted that he had not had any opportunity of consulting with his colleagues on the question.

Mr. RITCHIE said the Committee was not yet in its complete form; but the names he had submitted were proposed, after consultation on both sides, in the usual way.

The motion was agreed to.

Friday, March 20.

THE METROPOLITAN WATER SUPPLY INQUIRY.

Mr. RITCHIE moved—"That it be an instruction to the Committee on the London Water Commission Bill that they have power to inquire into all matters connected with the nature, price, management, sources, and sufficiency of the water supply of London and it suburbs, and to insert in the Bills such provisions in connection therewith as in their judgment are expedient."

Mr. CAUSTON suggested that the right honourable gentleman should move a further instruction to the effect that the Committee should inquire first into the subject of the Metropolis Water Charges Bill, which had already been referred to it. He said there was a likelihood of an increase in the charges in respect of water in consequence of the quinquennial re-valuation coming into operation on the 6th prox. If the re-valuation should be permitted to come into force, there would be a fresh charge of £40,000 annually on the ratepayers of London. The matter was therefore very urgent.

Mr. RITCHIE said it was perfectly true that the House had read a second time the Bill to which the honourable gentleman had referred; but it was well understood that in doing so it did not commit itself to the measure, but it was in order that the Bill might be sent to the Committee. The honourable gentleman said that, unless what he proposed

was done, the re-valuation would come into operation on the 6th prox. In that case no action which the Committee could take would prevent this, because the Committee could not possibly report in time. The Bills were of enormous importance; and they must be left to the Committee to decide upon. He was sure they would take into consideration all the circumstances of the case; and therefore he could not assent to the suggestion.

Sir J. LUBBOCK said the names of the honourable members to constitute the Water Committee only appeared on the paper the very morning they were moved; and the instruction before the House was only put down on the preceding day (Thursday). On such important questions, he thought more time should be allowed for consideration. He would like to ask the President of the Local Government Board whether, under the instruction as framed, the Committee would be able to inquire into the efficiency, condition, and value of the works, and, if not, whether he would introduce words to that effect. As regarded the suggestion of the honourable member for Southwark (Mr. Causton), he felt the force of what had been said by the right honourable gentleman; but he hoped the Committee would see their way to consider this question at an early stage of their proceedings.

Mr. PICKERSGILL said the instruction had come upon some members as a surprise. He would respectfully suggest that the right honourable gentleman should withdraw it now, and give the House a further opportunity of considering it. Would he accept an amendment?

Mr. RITCHIE said the instruction had appeared on the paper at different times; and it seemed to embrace everything that could possibly be referred to the Committee. With regard to the question of the right honourable baronet, he felt sure that, as the water supply depended to a very considerable degree on the state of the works, the matter he wished to see inquired into would come before the Committee. He did not think an amendment to the instruction was required. So far as it went, he believed that it was an instruction worthy of the support of the House, and that it comprehended everything necessary to be inquired into.

The motion was agreed to.

THE COMMITTEE ON THE METROPOLITAN WATER BILLS.

Sir Matthew White Ridley, Sir H. Roscoe, Mr. J. W. Lowther, and Mr. Rowntree are the members added by the Committee of Selection to the Select Committee on the London Water Commission Bill and the other Bills dealing with the water supply of the Metropolis.

THE LONDON COUNTY COUNCIL AND WATER SUPPLY.

A Bill "to confer powers upon the London County Council with respect to the supply of water," was brought in by Sir J. Lubbock, Mr. H. Vincent, and Mr. Lawson, and read the first time; the second reading being fixed for the 8th of April, on which day Mr. Boulnois will move the rejection of the measure.

The following progress was made with Private Bills last week:—

Bills read the first time: Bristol Gas Bill; Filey Water and Gas Bill; Newark Corporation Bill; Malvern Water Bill; Mountain Ash Local Board Bill; Troon Water Bill.

Bills reported: Fylde Water Bill; Llanelly Local Board Water Bill; Sunderland and South Shields Water Bill; Western Valleys (Mon.) Water Bill.

Petitions against the following Bills were presented:—

London Water Commission Bill, from the Corporations of Hertford and Richmond.

London Water (Meter) Bill, from the East London Water Company, the Grand Junction Water Company, Lambeth, and the Provincial Water Companies Association.

Metropolis Water Supply Bill, from East Ham, East Molesey, Hertford, Richmond, the Thames Riparian Owners' Association, Twickenham, Walthamstow, Wimbledon, and Woodford.

Metropolitan Water Companies' Charges Bill, from East Ham, the Provincial Water Companies' Association, and Wimbledon.

LEGAL INTELLIGENCE.

COUNTY OF LONDON ASSESSMENT SESSIONS.

Sessions House, Clerkenwell, E.C.—Saturday, March 14.

(*Before Sir* P. H. EDLIN, Q.C., *Chairman, and a Bench of Magistrates.*)

The Assessment of the Crystal Palace District Gas Company's Works.

To-day the Court proceeded to hear the appeal of the Crystal Palace District Gas Company against the assessment made by the Lewisham Union in respect of the Company's works and plant situate at Lower Sydenham.

Mr. POLAND, Q.C., and Mr. RYDE appeared for the appellants; Mr. PHILBRICK, Q.C., and Mr. PAYNE represented the respondents.

Mr. POLAND, in opening the case, said he would at once hand up to the Court the valuation made by Mr. Ryde, upon which he intended to rely. Before going through it, however, he wished to call attention to the figures as they stood in the old list and as they now appeared. In the 1885 list, the value of the property was put at £10,819 gross and £8425 rateable; but in the list now appealed against, it appeared as £13,500 gross and £10,500 rateable. The parish of Lewisham contained 78 per cent. of the Company's property; there being not only the gas-works, buildings, and plant, but the houses of the Secretary, Engineer, foreman, and night foreman, as well as productive and unproductive mains. The other property of the Company extended into the parishes of Penge, Croydon, and Beckenham, which were outside the county of London, and also into the parishes of Camberwell and Lambeth. But the amounts in respect of the two latter were so small that, although there were appeals against them, they were only made for the purpose of adjusting the complete rateable value between the different parishes in the county of London; and as they were only £100 each they were hardly worth considering. He then called attention to the respondents' case, in which they distinguished between the non-productive and productive property, and alleged that the value of the indirectly productive property within the parish was £11,556 gross and £9633 rateable, and that of the productive £3643 gross and £3036 rateable. So that it appeared they were prepared to contend that the total gross value was £15,199 and the rateable value £12,669, notwithstanding that in the list itself it was assessed at £13,500 and £10,500. In meeting this case, he should rely not only upon Mr. Ryde's valuation, but on that of Mr. Corbet Woodall, who had had very large experience in the management and rating of gas-works. He would now hand in a statement showing the reductions which had been made in the price of gas from time to time.

The CHAIRMAN remarked that, taking the general result, it appeared from the statement that in 30 years the price had fallen from 6s. to 2s. 6d. per 1000 cubic feet.

Mr. POLAND said this was so; and since the last quinquennial valuation, in 1885, it had been reduced 4d.—from 2s. 10d. to 2s. 6d. per 1000 cubic feet—which represented a difference of £12,000 a year to the Company.

The CHAIRMAN said this figure would not be of any use unless they also took into account the effect, whatever it might be, of the increased consumption of gas which had resulted from the diminution in price.

Mr. POLAND said that this information would be furnished during the progress of the case. The learned Counsel then went through Mr. Ryde's valuation in detail, and said that he would not trouble the Court at that moment with the second valuation—that by Mr. Woodall—which was but slightly different from Mr. Ryde's; but he was sure that when the Court had heard the evidence, they would arrive at the conclusion that the Assessment Committee's valuation was very much in excess of the true rateable value of the property. But whatever decision was arrived at, it would probably have an influence in settling the cases in the parishes that were outside its jurisdiction.

The CHAIRMAN said the appeal raised the question as for productive and unproductive property—a question which arose in the Mile End Old Town case.

Mr. PHILBRICK said that was so. They accepted the decision in the Sheffield Gas Company's case, which was their case; and this was what they were there for.

Mr. *E. Ryde* was then examined by Mr. POLAND. He said he knew the works of the Crystal Palace District Gas Company, the greater part of which were in the parish of Lewisham. It contained some portion of every description of gas property—productive and unproductive works and mains, and everything they could have. In making his valuation, he had taken the receipts of the Company for the year 1889, which were: For private rental, £88,158; for public rental, £7837—making the total gas-rental £95,995. The rental of meters and stoves was £2049; bringing up the total rental to £98,044. From this he deducted £445 for bad debts; leaving £97,599. Then with regard to working expenses, he had taken the coals, including all charges, from the accounts for the year 1889—£53,858. To this he added the increased price which a tenant must look forward to have to pay for the coal—viz., 3s. 6d. per ton on 78,499 tons—amounting to £13,737, and bringing up the cost of raw material to £67,595. This was the first estimate that was made; and it was that sum of 3s. 6d. which produced, after a good deal of consultation with Mr. Livesey and other gentlemen, the 2s. 6d. of which they heard on the previous day in the South Metropolitan Company's case. The actual advance in the price of coals alone, free on board, was from 7s. to 12s. 6d. per ton. Then there was an increase to be considered in the price of getting the coals from the pits' mouth into the works; and there they encountered the labour troubles and the shipping difficulties. He assumed, however, that although coals had gone up so much in price, before the next quinquennial period arrived they would come down again. Therefore, instead of putting 5s. 6d. or 6s. as the increase, he had put 3s. 6d., as being a reasonable sum for the purpose. Purifying materials, wages, &c., he had taken from the accounts—£3133. This added to the £67,595 for the coal made £70,728. From this figure he deducted the amount received for the residual products. Coke, less labour and cartage, came in 1889 to £23,336. To this he had added £4667, being an estimated increase in price of 20 per cent.; bringing out the figure for the coke at £28,003. This product really rose 29 per cent.; but the increase in the quantity of coal carbonized was equal to 26 per cent., and therefore it was balanced. The breeze, less labour and cartage, was £511. Tar was £4685 (being the actual cost in 1889), for which he had estimated an increase of 10 per cent., adding £468. With regard to tar, there was a material rise, and then it fell again; and at the present time the price had not been increased. So that the allowance of 10 per cent. was unnecessary, and though it was in favour of the parish he did not seek to alter it. This was his estimate at the time. Ammoniacal liquor and sulphate, less acid, labour, &c., amounted to £4347; bringing up the total residual products to £38,026, and reducing the net cost of coal and purifying materials to £32,702. Further items of working expenses were: Salaries of Engineer and officers (manufacturing department), £1989; wages and gratuities (£5982 × 2, being twice the actual sum paid in the last half of 1889), £11,964; salaries of officers and clerks (light office), £1978; repairing and renewing meters and gas-stoves, £1638; lighting and repairing public lamps, £1780; Directors' allowances, £1500; salaries of Secretary, Accountant, clerks, &c. (management department), £1572; collectors' commission, £1491; stationery and printing, £610; general establishment charges, £914; Auditors, £100; law charges, £7; workmen's sick fund, £93; superannuation fund, £28; horses and carts, £127; repairs, &c., to machines and chattels (other than those to the rateable hereditament), £6000—bringing up the total working expenses to £64,493. To this he added: Rates and taxes, 6s. in the pound on an assessment of £7069, £2121; making a total of £66,614. This total amount deducted from the gross receipts—£97,599—left the net receipts £30,985. Then he dealt with the occupier's share; allowing interest at 5 per cent. on tenant's capital (£76,000), £3800; trade profits, 10 per cent. on do., £7600; risks and casualties, 2½ per cent. on do., £1900—making £13,300. This deducted from the net receipts represented the gross value of £17,685. Then as statutable deductions he estimated for the maintenance of works, machines, and retorts, repairs, and labour, £13,153. Allowing £63 for old materials sold, there was left a total of £13,090, deducting £6000 for repairs other than to the rateable hereditament, there was left £7090. Then repairs, maintenance, and renewal of mains and service-pipes, and labour came

to £2799; insurance (¾ per cent. on £50,000), £187; renewals of gas-holders, £540—making the total statutable deductions £10,616. This deducted from the gross value left the rateable value at £7069 according to the computation. The tenant's capital was estimated on the basis of five months' working expenses, which represented £42,933; five-eighths of five months' receipts from the sale of residuals, £9902; meters and gas-stoves (10 years' purchase), £20,490; stock of coal and purifying materials for six weeks, £8161; horses and vans, £3000; tools and implements, £2500; stores, £4878; cash at bankers (say), £3940. Having regard to the fact that the whole thing was valued at £7000 a year, he attributed £5000 to the gas-works, buildings, plant, &c.; £100 to the officers' houses; £480 to the productive mains leading from the works to the Crystal Palace; and £211 to the unproductive mains—making a valuation of £5791 for the parish of Lewisham. The balance he distributed among the other parishes in direct proportion to the receipts from those parishes.

Cross-examined by Mr. PHILBRICK: He had valued the gas-works as works; but he was not in a position to tell the Court what the structural value of the works was.

The CHAIRMAN said there was a very great difference between Mr. Ryde's valuation of £5000 and the Assessment Committee's figure of £9000 odd.

Mr. PHILBRICK said he would call attention to one fact that was before the Court—viz., that the present rateable value of the property on the last quinquennial assessment was £8425. (To witness:) You reduce that figure to £5791. Has there been any large extension of the works?

Witness said there had been extra buildings erected. He could not say whether or not these were represented by a sum of £11,000; but he did not think it was very material, as the chief point for consideration was what the works were worth per annum. As a matter of fact, they could not have increased in value, because the Company had to go to their reserve fund last year to make up their dividend.

Mr. PHILBRICK asked the witness if he had taken into account the fact that the actual net profits during 1889 were something more than £9000 in excess of the previous quinquennial valuation.

Witness said he had not taken it into account in this form, but had taken the Company's actual receipts and expenditure as the basis of his valuation.

At this stage the parties had a consultation with a view to a settlement; but it was intimated that they had failed to agree.

The CHAIRMAN stated that perhaps the Court might be able to help them; and if Counsel cared to see him in his private room, he would be glad to meet them.

Subsequently this suggestion was carried out. On returning,

The CHAIRMAN said that, although the Court were about to give their decision on this appeal, it must be understood that they did so after having had the respondents' case most ably presented by Counsel; and he hoped the conclusion they had come to would be satisfactory to both sides. There were many considerations affecting the case which must not be lost sight of; and, in stating their decision, it must not be taken that they accepted implicitly every figure in Mr. Ryde's valuation. As to more than one of them, he felt he could not adopt them; but, in view of the whole of the facts, and to avoid further litigation in the matter, he would proceed to state what had been arrived at. The Court were of opinion that the gross value of the Company's property should be reduced to £13,000, and the rateable value to £9000. There would be no order as to the costs of the appeal, which involved questions which had to be properly discussed; and it was impossible, with due regard to the interests of their respective clients, that a settlement could have been arrived at by Counsel without appearing before the Court. With regard to the parishes of Penge, Beckenham, and Croydon, he would be glad to hear that they also had been arranged.

BOLTON COUNTY COURT.—Wednesday, March 18.

(*Before Mr.* E. JONES, *Judge.*)

The Allowance of Discount to Gas Consumers.

To-day the Bolton Corporation sued Mr. J. C. Stredder, a member of the Town Council, for the sum of 15s. 8d. due upon a gas account.

Mr. BRADBURY appeared for the Corporation; Mr. GRUNDY represented the defendant.

Mr. BRADBURY, in opening the case, said there was no dispute as to the facts; the question at issue was being fought on principle. By the Bolton Improvement Act of 1872, section 82, the Corporation were entitled to charge 4s. per 1000 cubic feet for gas supplied to the consumers within a radius of two miles from the Town Hall; and as long as they kept within this limit, they could make what terms and conditions they deemed best. As a matter of fact, they charged at the rate of 3s. per 1000 cubic feet for gas; an allowance of 6d. per 1000 feet being made if the account was paid within 21 days of the date of delivery. The defendant sent a cheque for the amount of his account—£4 15s. 8d.—less 15s. 8d., on the day after the last day allowed for payment; and as he declined on principle to pay any more, he was sued for the amount.

Mr. GRUNDY said the defence was that the real charge was 2s. 6d. per 1000 cubic feet, and that the extra 6d. put on if the account was not paid within 21 days was a penalty to which defendant was entitled to relief in a Court of Equity. Authorities were quoted as to what a "penalty" was; and it was argued that the charge for default by the Corporation was unreasonable and excessive—being at the rate of 7000 per cent. per annum.

His HONOUR held that the Corporation were entitled, under the Act, to make the condition they did. The Corporation said: "We charge you 3s. per 1000 cubic feet; but if you pay within 21 days, an allowance of 6d. per 1000 feet will be made." This was perfectly legal; but if they had said: "Our charge is 3s. per 1000 feet; and if you do not pay within a given period, an extra 6d. will be charged," that would be in the nature of a penalty. He should enter a verdict for the full amount claimed, with costs on the higher scale; but he would give leave to appeal.

MISCELLANEOUS NEWS.

METROPOLIS GAS SUPPLY.

Recent Appeals to the Chief Gas Examiner.

(*Continued from p.* 507.)

In the matter of the appeals of THE GASLIGHT AND COKE COMPANY *against the report of the Gas Examiner at the Millbank Street testing-place for excess of sulphur on Aug.* 7 *and* 8, 1890.

Each of these appeals was lodged within seven days after the day on which the report in question was made. At the hearing which I gave to the parties, Mr. Dibdin appeared for the County Council; Mr. Trewby appeared for the Company.

The Company pleaded that the excess of sulphur in the gas was occasioned by a breakdown of a part of the manufacturing machinery, which unavoidably caused that disturbance. It appears that a crack in the cast-iron base-plate of a scrubber became suddenly much enlarged, so as to allow not only the aqueous and oily contents of the scrubber to run out, but also to allow the escape of considerable quantities of gas. It then becomes necessary to disconnect the scrubber and to let the gas pass on for awhile without undergoing that purification which the scrubber effected. One of the impurities thus left in the gas was carbonic acid; and this carbonic acid accordingly passed on to the lime purifier, and greatly impaired its efficiency.

The Company gave various particulars of the measures which they adopted for setting things right as speedily as possible.

I am satisfied that the excess of sulphur in the gas on the 7th and 8th of August was occasioned by the unavoidable cause or accident described to me; and accordingly the Company are not liable to any forfeiture on account of it.

(Signed) ALEX. W. WILLIAMSON, Chief Gas Examiner.

Dec. 10, 1890.

In the matter of the appeal of THE GASLIGHT AND COKE COMPANY *against the report of the Gas Examiner at the Kingsland Road testing-place, showing an excess of sulphur in the gas supplied by the Company on Sept.* 29, 1890.

The appeal was lodged within seven days after the day on which the report was made. At the hearing which I gave to the parties, Mr. Dibdin appeared for the County Council; Mr. Trewby appeared for the Company.

The Company admitted the substantial correctness of the test. They could not, however, account for the presence of the excess of sulphur in the gas, as, according to the analyses of their officers, the gas sent out from their works contained a considerably smaller proportion of that impurity.

The Company pleaded for exemption from forfeiture under clause 9 of the Gas Act, 1880, which lays down as follows: "Provided always that if any one day the gas supplied by the Company at such testing-place is of less purity than it ought to be under the Special Act, the average of all the testings made at such testing-place on that day, and on the preceding, and on the following day, shall be deemed to represent the purity of such gas on such one day at such testing-place." The average of the tests on the 27th, 29th, and 30th (28th being Sunday) brought the Company within the limit of forfeiture; and it was argued that the test of the 27th was not a statutory test, as it was not performed in accordance with the instructions of the Referees.

In order to test the gas for the amount of sulphur, the Gas Examiner has to burn the gas for 20 hours under prescribed conditions, and to collect, in a suitable form for quantitative analysis, all the sulphur from the products of combustion of 10 cubic feet of the gas. He then uses half of the material thus collected for certain analytical operations accurately laid down for him, and ultimately weighs a definite compound of sulphur. By a simple calculation, he ascertains from this weight how much sulphur there was in the 10 cubic feet of gas. But inasmuch as a given weight of gas occupies a greater volume when the barometer is low than when it is high, and also a greater volume when the thermometer is high than when it is low, the Gas Examiner is required to ascertain what was the average barometric pressure, and what was the average temperature at the time that the gas was being measured out by the meter. For this purpose it is ordered by the Referees that the Gas Examiner shall take the barometric pressure, and also the temperature, on the day on which the testing commences, and also on the day on which it closes; and he is to use the means of the two readings of each instrument in calculating the allowance to be made for the disturbing influence of pressure and temperature.

In common cases, the Gas Examiner makes his first readings when he starts the process of burning his 10 cubic feet of gas, and his second readings next morning, when he completes his analysis of the sulphur in the 10 cubic feet of gas; but as no tests are made on Sundays, the products formed by the combustion began on Saturday are not analyzed till Monday, and the second readings are made on that day instead of being made at an interval of one day from the first readings.

The Company contended that the second readings ought to be taken as soon as the combustion is complete, and that inasmuch as the second readings for the combustion which had been begun on Saturday morning, the 27th of September, were not taken till Monday morning, the test was not valid. The Gas Examiner understood that, inasmuch as the operations by which he ascertains how much sulphur was in the gas were not completed till the Monday morning, Monday was the "day on which the testing closed," and accordingly the lawful day for the second readings of barometer and thermometer.

Inasmuch as the Company had not appealed against the report of the Gas Examiner for the 27th of September, but only against that for the 29th of September, the question of the validity of the test of the 27th is not a matter which I have to decide. The report of the Gas Examiner for the 29th of September must be accepted.

(Signed) ALEX. W. WILLIAMSON, Chief Gas Examiner.

Dec. 10, 1890.

THE RATING OF THE SOUTH METROPOLITAN GAS COMPANY'S WORKS.

In the course of the report of the recent proceedings at the Sessions House, Clerkenwell, E.C., on the appeal of the South Metropolitan Gas Company against the assessment of their property by the Greenwich Union and other parochial authorities, given in the JOURNAL last week, reference was made to the computation made by Mr. Thomas Newbigging, C.E. (the only engineering witness called for the appellants), of the value of the Company's property for assessment. Most of Mr. Newbigging's figures were necessarily brought out in the course of his examination; but it will perhaps conduce to a fuller comprehension of the case to reproduce them in the form in which they were presented.

SOUTH METROPOLITAN GAS COMPANY.

Computation of Value for Assessment to the Poor, based on the Working for the Year ending Dec. 31, 1889.

RECEIPTS—		
Gas-rental		£642,529
Rental of meters and stoves		17,747
Total		£660,276
Less bad debts		2,587
Gross receipts		£657,689
EXPENDITURE—		
Manufacture of gas—		
Coal	£342,097	
Add for increase in price, 600,000 tons, at 2s. 6d. per ton	75,000	
	£417,097	
Less residuals	£247,665	
Add 20 per cent. to receipts for coke	32,289	
	279,954	
	£137,143	
Purification	15,953	
Salaries of engineer, &c.	9,513	
Wages	£99,653	
Add 10 per cent. for increase	9,965	
	109,618	
Distribution of gas—		
Salaries and wages of officers, &c.	11,646	
Repairing and renewal of meters and stoves	12,784	
Public lamps, lighting and repairing	11,539	
Management—		
Directors' allowance	3,500	
Salaries of Secretary, Accountant, &c.	4,072	
Collectors	10,605	
Stationery and printing	1,963	
General charges	5,514	
Company's Auditors	225	
Law charges	2,735	
Pensions and workmen's fund	3,809	
Gas Referees and Official Auditor	482	
	£341,101	
Rates and taxes at 6s. in the pound on an assessment of £77,953	23,385	
		364,486
Net receipts		£293,203
WORKING CAPITAL—		
Working expenses, five months' expenditure—*i.e.*, 5-12ths of £364,486 × £70,607 repairs and maintenance = £435,093	£181,289	
Add one-third of five months' receipts for sale of residuals	38,882	
Stock of coal, 75,000 tons, at 13s. 10d.	51,874	
Sundry stores	58,950	
Tools and implements	10,000	
Office furniture	1,000	
Meters and stoves on hire	185,825	
Tenant's capital	£527,820	
Interest on tenant's capital at 5 per cent.	£26,391	
Trade profits on do. at 10 per cent.	52,782	
Risks and casualties on do. at 2½ per cent.	13,195	
Tenant's share		92,368
Gross value		£200,835
STATUTABLE DEDUCTIONS—		
Repairs and maintenance—3d. per 1000 feet on 5,648,601,000 cubic feet of gas sold during the year	£70,607	
Renewals—The sum which set aside annually, and invested at 3 per cent. compound interest, will reproduce £2,400,000, the value of the hereditaments, at the end of 30 years	50,400	
Insurance, £500,000, at $\frac{3}{8}$ths per cent.	1,875	
		122,882
Rateable value of the whole		£77,953
Apportionment.		
Rateable value of the works, or indirectly productive portion, £1,600,000 at 3¼ per cent.		£52,000
Rateable value of the mains, or directly productive portion		25,953
Rateable value of the whole		£77,953

In the following table are given the figures settled for the other parishes concerned in the Company's appeal; the gross values, as fixed by the Assessment Committees, being accepted in each case:—

Name of Parish.	Assessment Committee's Valuation.		Agreed Rateable Value.	Reduction.
	Gross.	Rateable.		
St. Paul, Deptford—Mains	£7200	£6000	£5046	£954
Gasholders and stations in Creek Street	605	484	275	209
Do. in Blackhorse Bridge	777	622	400	222
St. Nicholas, Deptford—Mains	900	750	660	90
Lee—Land occupied by gas-pipes	1920	1600	1520	80
Eltham—Do.	600	500	482	18
Lewisham—Do.	2700	2250	2170	80
Clapham — Land occupied by mains, services, and fixed plant	4351	3626	2996	630
Streatham—Mains	4437	3698	3057	641
Charlton—Mains, pipes, &c.	1177	883	723	160
Kidbrook—Land occupied by mains	433	325	269	56
Woolwich—Mains and services	3733	2800	2260	540
Plumstead—Mains	1866	1400	1158	242

AMMONIA GAS PURIFYING AND ALKALI COMPANY, LIMITED.

The report of the Directors of this Company for the past year has been issued, in view of the annual general meeting, which takes place to-day. It states that there was a profit of £984 on the working, which, when added to the balance, makes a sum of £1234 to the credit of the profit and loss account. The Directors have been enabled to pay off the loan of £500 from their bankers; so that the concern is now clear of all liability. They consider that, in the future interests of the Company, it would be advisable to retain the balance as working capital, rather than to distribute it in the shape of a small dividend, which would be of little benefit to individual shareholders, but might be of great advantage to the Company generally. The Directors regret that the purification of gas at Belfast is not yet a complete success. The plant was designed to deal with a make of 2½ million cubic feet of gas; but during the late winter it had to purify 3¼ millions per diem. This occasioned great difficulty, and, by overtaxing the plant, prevented the Directors from dealing with minor troubles as they arose. They hope, however, when the make is reduced as the season advances, they may be able to suggest certain alterations and improvements in the plant which, at a small cost, will enable them to overcome the existing difficulties, and purify the gas up to the required standard of purity. The Directors are approaching other gas-works with a view to the adoption of their system; and they believe that eventually it will be recognized as one which combines efficient purification with economy of labour and space. As regards the recovery of sulphur from gas, the Directors report that their process was adopted during the past year at the Nottingham, and the Barrow-in-Furness Gas-Works, as well as by Messrs. Kempson and Co., of Alfreton. The United Alkali Company have absorbed a large number of the Company's Licensees; but they are continuing the process at their various works in a satisfactory manner, and are paying substantial royalties. Certain difficulties arose with respect to the effluent gases discharged from the kilns; but the Directors have, by prompt measures, been able to overcome them, and have taken out a new patent, which should be a valuable addition to the Company's property, and make this process a complete success.

The Leighton Buzzard Gas Company's Bill.—In announcing last week that this Bill had passed the Committee stage in the House of Commons, a local contemporary stated that it is intended, when it comes before the Upper House, to introduce a clause by which the town will be given the opportunity of buying the Company's property at any time.

The Gas Supply to Oldham Out-Townships.—It is reported that writs have been served upon the Oldham Corporation, at the instance of the out-townships, with respect to the supply and price of gas. It will be remembered that, when the last-obtained Borough Improvement Bill was before the Committee of the House of Lords (presided over by the Duke of Richmond), it was decided that the price of gas to the out-townships included within the area of supply should be the same as charged in Oldham, and that after a certain amount of profit was realized, the price should be reduced. Subsequent to this the Corporation decided to light the street lamps and municipal buildings free of charge—a decision which has been altogether unfavourably looked upon by the out-townships; and several protests have been made on the subject. Matters have now resolved themselves into a definite shape by the issue of writs, which may be considered the first step towards testing the validity of the decision arrived at and carried out by the Corporation. The plaintiffs claim: (1) A declaration that in ascertaining the profits of the undertaking for the purposes of the said Act of 1886, there should be taken into consideration the value of the gas used by the defendants for street lighting and other public purposes within the borough. (2) An injunction restraining the defendants, their servants and agents, from using gas for the street lamps, market, and public buildings within their borough, or (in the alternative) from so doing without crediting the value thereof in the revenue account of the gas undertaking, or allowing for the cost thereof in ascertaining the profit of the undertaking, or without charging the borough fund, or general district fund, or other proper fund, the value of such gas (in the alternative) unless the defendants supply, within the respective districts of the plaintiffs, gas gratuitously to the street lamps, markets, and public buildings. The writs were delivered at the instance of the local authorities of Chadderton, Royton, Crompton, and Failsworth.

STAFFORD CORPORATION GAS SUPPLY.

Proposed Extension of the Works.

At the Meeting of the Stafford Town Council on the 10th inst.—the MAYOR (Mr. Alderman W. Peach) presiding—the Gas Committee reported that they had fully considered a statement prepared by the Gas Engineer (Mr. J. F. Bell), as to necessary extensions and alterations at the gas-works; and they recommended that application be made to the Local Government Board for their sanction to borrow £15,000 to cover the cost.

Mr. Bell's report to which the Committee referred gave a financial history of the gas undertaking since it came into the hands of the Corporation. The purchase-money, he stated, amounted to £77,583. The total amount actually expended was now £85,642; and £13,514 had been repaid. At the time of the purchase, the annual make of gas was 66¾ million cubic feet; and this year it would amount to more than 100 millions. Extensions of the works were absolutely necessary in order to meet present and future demands; for during the past winter, when all the retorts were at work, it was almost impossible to keep the town and district supplied with gas. The proposed extensions were as follows: In order to run a railway siding direct into the suggested new coal-stores, it was intended to purchase about 230 square yards of land on the east side of the works; so that part of Bull Hill might be enclosed in the works, and the land purchased form a new road. The cost of the land, diverting the road, obtaining powers, and making new streets, was estimated at £250. The cost of the new railway siding complete was put at £2500, which might be somewhat increased through having to pile through 40 or 50 feet of peat for bridge foundations. The profit on the siding, however, was estimated at £400 on the present traffic. In order to produce sufficient gas, more retort power was urgently needed, as last year it was almost impossible to manufacture enough gas with every retort in use. Mr. Bell therefore proposed to extend the retort-house by 60 feet, with a retort-bench of four arches, each containing nine retorts or 18 mouthpieces. Each of the 36 retorts would be capable of producing from 7000 to 8000 cubic feet of gas per mouthpiece in 24 hours, or an increase in the producing power of more than half a million cubic feet per diem. The retort-house would be constructed on an improved plan for the greatest convenience in working; and it was proposed to arrange it so that machinery could at any time be introduced for drawing and charging the retorts, and also so that the two existing retort-benches might be taken down and rebuilt on the improved plan in order to give a total producing power of 1¼ million cubic feet in 24 hours, or more than double the present production. The total cost of this portion of the work would be £1580. The new coal-store would run the whole length of one side of the retort-house, communicating directly with it. A line of rails it was proposed should be laid right through the building, which would be 154 feet long by 32 feet wide and 20 feet high. This would afford room for stocking 2000 tons of coal; and by permitting of storeage in the summer months, would facilitate the purchase of coal at lower rates. The cost Mr. Bell estimated at £800. A new washer capable of removing every trace of ammonia from a million cubic feet of gas daily, would cost £600. The erection of two new purifiers would cost £1050; the necessary removal and re-erection of two of the present purifiers, £250; and the taking down and rebuilding of the oxide-shed, £300. With these alterations to the purifying plant, costing altogether £1600, the gas would be as pure as it was possible for it to be made. The holders, the report continued, should be of sufficient capacity to contain at least 24 hours' maximum consumption of gas, which in Stafford was not less than 600,000 cubic feet at present. The three gasholders, however, would only contain a total of 460,000 cubic feet; and two of the holders were out of repair. No. 3 holder, Mr. Bell recommended, should be telescoped this year at a cost of £2050, adding 200,000 cubic feet to the storeage capacity; while the repairs would be done in due course. The total cost of these various improvements was £11,780, to which was added £4000, the amount required for new services, meters, and fittings for cottage property on the fortnightly system, and for further extension to the plant at the works—the total then being £15,780, for which there was to be deducted £1940 for capital borrowed but not expended. To the sum of £13,840 thus required for extensions £1160 was added as an allowance for extensions of gas mains, services, new meters, &c., in the next few years; and Mr. Bell therefore recommended that permission to borrow £15,000 should be obtained from the Local Government Board. At 3½ per cent. a sum of £790 set aside for thirty years would repay principal and interest. The saving due to the railway siding and new modern plant would more than pay the amount required each year, without allowing anything for the additional quantity of gas the department would be able to make and sell at a profit.

Alderman W. H. PEACH, in moving the adoption of the Committee's report, said the amount of gas delivered during the past month was 12,140,000 cubic feet—an increase over the corresponding month of last year of 1,328,000, or 12¼ per cent. The average illuminating power of the gas was 17·91 standard candles. About this time last year it was reported that the Income-Tax Commissioners had refused to allow the Gas Committee the tax on the sum of £856, which was charged to the depreciation account. The Committee decided this year to appeal from the Local Commissioners to the Special Commissioners, with the result that common sense prevailed, and the appeal was allowed, so that in future they would not have to pay on the depreciation fund. By far the most important part of the report was that relating to the proposed extensions at the works; and the matter would require the most serious consideration of the Council. It had been the privilege of the Chairman of the Gas Committee ever since the works were acquired by the Corporation, to announce an increase each month in the quantity of gas delivered as compared with the corresponding month in the previous year. But while the output had been steadily progressing, the producing power had been stationary; and they had now arrived at the point beyond which it was impossible to proceed without additional plant. Since the works had been in the hands of the Corporation, the output had increased by something like 65 per cent.; and last winter they were absolutely making every foot of gas possible. The prospects of the electric light competing successfully with gas seemed very remote, as the latter was very much cheaper than the electric light could be supplied at. The go-ahead town of Leicester had just authorized the expenditure of £100,000 for the extension of their gas-works. In Stafford additions were contemplated as far back as 1879; but as the question of a railway siding could not be satisfactorily settled, the work was not proceeded with. If an increase of plant was necessary then, how much more necessary it was to-day the figures before the Council conclusively proved. After reviewing the report of Mr. Bell, Alderman Peach pointed out that the works had not cost the Corporation anything. So far, they had simply backed the bill for £85,000, off which £15,000, or £7000 more than was necessary, had already been paid. They were getting the benefit of this £7000. A sum of £10,000 had been spent in extensions and improvements during the last seven years, and had been charged to revenue account. The sulphate plant, new purifiers and shed, workshops, stores, and extensions of mains had all been carried out in this way. About £17,000 had been handed over towards the rates; and—in the shape of the difference between the present price of gas and that when the works were taken over—from £30,000 to £40,000 had been put into the consumers' pockets. Taking it at £30,000, there was £62,000 net profit made on the transaction. The saving effected by the proposed extensions would more than repay capital and interest in 30 years. Of the original purchase money of the works, 60 per cent. was paid for goodwill, and only 40 per cent. for producing works; but of this new expenditure the whole would go to productive works, and they would be able to produce more gas of better quality, and larger profits.

Mr. GREATREX seconded the motion.

Mr. MYCOCK contended that it was not right for the Gas Committee to seek to raise the capital of the gas-works to above £100,000 when there was another light in the market. As they were doing nothing with the electric light, there were points in the report which were worthy of consideration and hearty support; but the amount asked for was decidedly more than the circumstances warranted. The first schedule of extensions amounted to £11,780; and if they took that off the £1940 of borrowed capital still on hand, it brought the amount down to the more reasonable figure of £10,000. He thought the expenditure of £2050 for telescoping No. 3 gasholder was not at all required; and he moved that the amount for which they should apply to the Local Government Board be reduced to £10,000.

The amendment was not seconded.

Mr. BAGNALL supported the motion, and defended the proposed increase of storeage accommodation, which, he said, was at present only equal to fifteen hours' supply.

Mr. LLOYD remarked that he was not fond of voting large sums of money, but he did so in this instance with pleasure, because he believed it indicated the prosperity of the works, and would lead to still better things.

Alderman PEACH observed that the addition to the holder would save a great deal of Sunday labour.

The report was adopted.

THE GREAT GRIMSBY CORPORATION AND THE GAS COMPANY.

A Proposal to make a Road across the Gas-Works.

An inquiry has recently been held at Great Grimsby by Mr. Arnold Taylor, one of the Inspectors of the Board of Trade, with reference to a Provisional Order applied for by the Corporation to give them power, *inter alia*, to make a road across the premises of the Gas Company, thus severing their works.

Mr. LAVERACK appeared for the Corporation; Mr. KERSHAW for the Gas Company.

Mr. LAVERACK, in stating the case on behalf of the Corporation, pointed out that the town was divided by the Manchester, Sheffield, and Lincolnshire Railway into two parts, the only communication between which, with one exception, was by means of level crossings. He mentioned this because one portion of the scheme was to provide communication between the two parts by means of subways, which had the support of the Railway Company. Describing each portion of the proposed improvements, he said that No. 5 was for a street branching off at right angles from a new street into Catherine Street; and it was to this that the opposition of the Gas Company was mainly directed. It would be seen that this would directly connect two very populous portions of the town. As to the objections of the Company, they said that the proposed street would take up land on which they might require to erect holders to meet the growing requirements of the town; and they could not obtain other land for the purpose without going to Parliament, and being put to considerable expense. He quoted from the Company's Act to show that this was a mistake; and argued that there was ample room for the Company to erect two more gasholders, and that they had sufficient accommodation to supply double the present quantity of gas. They also stated that it would interfere with their sidings, and prevent them from getting their coal into the works; but all they would have to do, if the street was made, was to take the siding in at the north end of the works instead of the south. They had the monopoly of supplying gas; and they paid a dividend of 10 per cent. He therefore thought that it was a little ungracious on their part to oppose this scheme.

Evidence was then called in support of the various proposals of the Corporation.

The *Mayor* (Mr. Alderman Bennett) stated that he was a Director of the Gas Company; and he considered the scheme a proper one. Several other Directors were of the same opinion. As to the siding, he thought there would be no difficulty in making other provisions; and the taking of the land for the road would not cripple the Company's storeage capacity.

Cross-examined: He had been a Director of the Gas Company for 30 years, and he knew that the works had been twice moved. There was no doubt Grimsby had grown; but he would not say that he expected the gas consumption was likely to double again in fourteen years. The Corporation would accommodate the Company with land on the other side of the line.

Re-examined: There was plenty of land vacant on the other side of the line which the Gas Company could have.

Mr. *J. Buchan*, the Borough Surveyor, deposed that the Catherine Street improvement was necessary; and as to the Gas Company's railway siding, there was nothing to prevent their coal going in at the north end of the works.

Mr. KERSHAW, on behalf of the Gas Company, submitted that the objection by them was one which called for very careful consideration—more so than the objection of an individual would do. Any injury to the Company which forced them to expend capital, so as to compel them to raise the price of gas, fell directly on the ratepayers as gas consumers; and the present scheme for continuing Catherine Street would, if carried out, greatly increase the working expenses of the Company by virtually compelling them to carry on two sets of works instead of one. There had been no public outcry for this Catherine Street scheme, nor had it been mentioned until a few months ago.

Mr. *F. Fowler*, a surveyor, said that he had known Grimsby for more than forty years; and he contended that all the purposes of the town could be served very well without the extension of Catherine Street. The Gas Company had been twice compelled to remove their works since 1846. They were now fast using up what land they had; and their present gasholder accommodation required extending. He believed that in 1877 the consumption of coal was 7000 tons, and in 1890, 14,000 tons; and he anticipated that in the next 14 or 15 years, it would again be doubled. Every bit of land the Company now possessed would therefore be wanted for increased storeage and other plant.

In cross-examination, witness said that there was not room for two gasholders on the works. All the land between the existing holders was wanted for the extension of the manufacturing plant.

Mr. *J. Barker*, Chairman of the Gas Company, stated that their capital was now £109,500. A dividend of 10 per cent. on this was paid, with the exception of £9000 at 8½ per cent., and £5000 of preference capital. The Corporation used about 15 million cubic feet of gas for which they paid 2s. 3d. per 1000 feet. Taking this as a basis of profit, it yielded about £375 towards the Company's dividend of £10,000. He knew the footpath across the Company's land. The traffic was very small; and this showed that Catherine Street was not wanted for public convenience. The cutting would greatly diminish the value of the Corporation land, as well as spoil that of the Company. The severing of the gas-works by the subway would destroy the siding accommodation, which the Company had used for fourteen years; and the land crossed by the proposed road was wanted for other purposes than that of a gasholder. In 1877 the gas made amounted to 71 million cubic feet; and in 1890, to 146 million feet. Great extensions were projected at the Docks for ocean-going steamers; and it had been stated in the Council that the present population would be doubled. It was reasonable therefore to infer that the Company would have to make double the quantity of gas, which would necessitate a large increase of plant.

Mr. *William Drewry*, the Engineer of the Company, said he had been in charge of the works about three months. For more than eleven years, he was the Manager of the Cleethorpes Gas Company, but he had known Grimsby from boyhood. The works were already short of room for the necessary extensions. The effect of making a road through the land, would be to completely spoil the working of the Company, and cut off their connection with the railway. There would not be room between the two holders for another one, as the space was required for other purposes.

Cross-examined: The railway siding certainly could not enter the works by the north entrance. There were two large tar and liquor tanks underground taking up all the available space; the sizes being respectively 24 ft. by 19 ft., and 39 ft. by 24 ft. There were besides three 14-inch pipes—one leading from the condensers to the exhausters; another was the outlet from the exhausters to the scrubbers; and the third led from the scrubbers to the purifiers. There was also one 16-inch pipe from the governor into the town; two large bye-pass valves about 4 feet diameter, with four 14-inch connections to each; and two 14-inch slide-valves from the hydraulic main and the condensers. There are also two 7-inch pipes, three 6-inch pipes, and eight 3-inch pipes to various tar and liquor pumps, tank overflows, syphons, &c., besides a 3-inch town water-pipe and drains. The west side of the retort-house was 12 inches below the surface of the ground, and the metal rail would be at least 6 inches more. It was impossible to run sidings on either side of the retort-house, unless the whole plant was removed and re-arranged.

Cross-examined: They could, of course, put down a gasholder between the other two; but it would be so small as to be quite useless. The greatest make of gas in twenty-four hours took place last Christmas, when it was 878,000 cubic feet; the storeage being 650,000 feet. To place the trucks of coal on and off the weigh-bridge required siding accommodation for 20 to 30 trucks now. This could not be done on the Company's works with the alterations proposed by the Provisional Order; but it could be done at present, and these facilities would be destroyed.

The proceedings then terminated; and the Inspector afterwards made an examination of the works.

The Extensions at the Elland Gas-Works.—The scheme of extension at the Elland Gas-Works is being pushed forward under the supervision of the Engineer and Manager (Mr. R. Porter); and we learn that the order for the whole of the condensers and other new works has been placed with Messrs. R. Dempster and Sons, Limited, of Elland.

Sequel to the Halifax Gas Scandal.—At the Leeds Assizes last Wednesday, Alderman Booth, ex-Mayor of Halifax, sued the proprietor of the *Halifax Free Press* for libel. The action arose out of the gas scandal which occurred at Halifax during Alderman Booth's mayoralty. A letter was published in defendant's paper alleging that the malignity and viciousness of plaintiff had held the Town Council in chains. Defendant refused to disclose the name of the writer; but it transpired during the proceedings that he was one of the discharged firemen at the gas-works. A verdict was given for plaintiff—damages £200.

COLONIAL GAS UNDERTAKINGS.

Reports as to the working of several colonial gas undertakings have lately come to hand; and we give below a few particulars therefrom.

The Australian Gaslight Company made a profit of £54,661 by the working in the second half of last year; and out of this sum they have paid a dividend of 9s. per share on those fully paid up, and 6s. per share on the new shares. This absorbed £49,606; leaving a balance of £5055. The Engineer (Mr. T. J. Bush) reports that the Company's plant is in good serviceable condition. The labour strike caused a loss of £32,892 to the Company. Only about one-third of this sum, at the most, will be returned by the temporary increase which has been made in the price of gas; and the remainder was drawn from the reserve fund. The revenue from the sale of gas, including the amount drawn from this fund, was £213,876; the expenditure, £162,893. With the view of stimulating the consumption of gas for cooking and heating purposes in Sydney and the neighbourhood, and increasing the sale of appliances therefor, the Company have recently issued a little pamphlet, bearing the title of "A Word to the Wise is Sufficient," setting forth pictorially the advantages attending the use of gaseous as compared with ordinary fuel for domestic purposes. The book is creditable alike to the compilers and the local printers; and its circulation (through the office of the Secretary—Mr. R. J. Lukey, late of Falmouth) has already borne good fruit in the shape of an increased demand for gas in the daytime.

The Brisbane Gas Company had at the close of the past half year a sum of £12,640 standing at the credit of the profit and loss account, out of which the Directors recommended a dividend of 6½ per cent. This absorbed £9093; the dividend-tax amounted to £257; and there was carried forward a balance of £3290. The Company a short time ago applied for legislative sanction to carry out a scheme of electric lighting; but they were unsuccessful. However, as large extensions are going on in one of their districts, there is not much doubt that their business will continue to increase.

The Launceston (Tasmania) Gas Company had a very satisfactory half-year's working, although their operations were rather interfered with by the great labour strike which took place throughout the colonies, one phase of which was noticed in the JOURNAL last week in connection with the Melbourne Metropolitan Gas Company. The turn-out of the wharf labourers at Tasmania did not cause much inconvenience to the Gas Company, as the Engineer (Mr. T. S. Cleminshaw, Assoc. M. Inst. C.E.) simply took into his own hands the unloading of the vessels, Although the men employed were unaccustomed to the work, and the appliances available were somewhat crude for the rapid handling of coal, he succeeded in getting in about 900 tons within three weeks of the termination of the strike, and this at the old prices. Consequently, beyond the purchase of 230 tons at an advanced rate, the Company came very well through the trouble—in fact, better than their neighbours. Of course, there was a lot of jeering; but the "freemen" were protected by the police, and there was little interruption of the work. The Conspiracy and Protection of Property Act (which was passed towards the close of 1889) put the Company in possession of ample means of securing their servants from open attacks by the unionists; and a man was fined under it just before they commenced operations. The fine was paid by the Union; but the incident had a useful deterrent effect. Coming now to the actual working of the Company, we find that the consumption of gas steadily increased; being about 8·75 per cent. over that of 1889. The gas-rental amounted to £8646; the public lighting produced £891; the sale of the residuals realized £998; and certain forfeits of discounts brought up the total receipts to £10,641. The expenditure came to £6540—salaries and wages amounting to £2513, and coal costing £2968; so that there was a sum of £4101 to be carried to the profit and loss account. The amount available for distribution was £3141, out of which a dividend at the rate of 11 per cent. per annum has been declared. The make of gas was about 27 million cubic feet, or 9835 cubic feet per ton of coal carbonized; the average illuminating power being 18·81 candles. The unaccounted-for gas was low—only 4·84 per cent. With the view of improving the public lighting, the Company have lately, at their own expense, put up seven 120-candle power lamps in lieu of 5-feet lamps in the principal streets; and these are much admired. The Corporation of the city have been thinking about a scheme of electric lighting; but nothing definite has yet been done in the matter.

Two Queensland gas undertakings may be conveniently noticed together. The report of the Directors of the Maryborough Gas Company for the six months ending Dec. 31 last shows that there was a balance of £1337 available for division at the close of the year. Out of this a dividend at the rate of 10 per cent. per annum has been paid; leaving a balance of £83. The Engineer and Manager (Mr. J. Henderson, C.E.) states that the whole of the plant and buildings connected with the works have been maintained in first-class order. Owing to the general depression in the town during the past twelve months, the additions to the mains and services were not in the same ratio as in previous years. A good deal of work was, however, done in renewals. A large number of the older services were replaced by new galvanized pipes instead of black ones—a change which, considering the nature of the soil, it was hoped would conduce to the longer life of this part of the distributing plant. The Rockhampton Gas Company made in the second half of last year a profit of £2124, which, with the amount brought forward, made a total of £2303 available for distribution. The Directors recommended the payment of a dividend at the rate of 10 per cent. per annum, amounting to £1494; writing off £200 for depreciation; placing £200 to the credit of the reserve fund; and carrying forward a balance of £409. In view of the possibility of the municipal authorities and residents requiring a supply of the electric light, the Directors obtained information from the Company's London Agents respecting the probable cost of an installation for Rockhampton; and they will consequently be prepared with a scheme should a demand for this system of illumination arise.

In Wellington (N.Z.) the labour troubles affected the working of the gas undertaking very seriously towards the close of last year; involving as they did a largely increased outlay for coal and additional expenditure in the manufacturing department. The consumption of gas was,

however, well maintained during the year; and the sales produced £26,365. The total receipts for the twelve months amounted to £31,062; the expenditure to £20,416. The interim dividend of 6 per cent. paid in July last came to £4800; and the balance carried to the profit and loss account was £5846. Out of this a similar dividend, making 12 per cent. for the year, was paid. The Engineer and Manager (Mr. H. P. Higginson, M. Inst. C.E.) reports that the whole of the plant has been kept in good order.

METROPOLIS WATER SUPPLY.

The Quality of the Water in February.

The returns furnished to the Registrar-General by the London Water Companies as to the water supply of the Metropolis during the past month show that the average daily supply was 180,491,255 gallons, as compared with 159,851,698 gallons in the corresponding month of 1890; being at the rate of 30 gallons per head of the population. Of the entire bulk of water sent out, 88,887,502 gallons were drawn from the Thames, and 91,603,753 gallons from the Lea and other sources. Reporting upon the quality of the supply, Dr. E. Frankland said: "Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health, was: Kent, 0·8; Tottenham and East London (deep well), 5·2; Chelsea, 5·4; West Middlesex, 6·6; and Grand Junction, 10·8 (Kent, on the 5th), 9·9 (Hanover Square, on the 5th), 5·5 (Marble Arch, on the 12th). The water abstracted from the Thames by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies, was, in all cases, of very inferior quality; being polluted by an abnormal amount of vegetable organic matter. That supplied by the Grand Junction Company on the 5th ult. (at Kew), surpassed in respect of organic impurity any sample of Thames water examined by me during the last quarter of a century. It was opalescent from imperfect filtration, and was not in a fit state for dietetic use. The remaining waters abstracted from the Thames were efficiently filtered before delivery. The water taken chiefly from the River Lea by the New River Company, though of better quality than any of the Thames-derived waters, contained more than three times as much organic matter as was found in January. The water supplied from the same source, but lower down the stream, by the East London Company, was of similar quality to the best of the Thames waters. Both supplies were efficiently filtered before delivery. The deep-well waters of the Kent, Colne Valley, and East London Companies, and of the Tottenham Local Board of Health, were all of excellent quality for dietetic use. These waters were clear and bright without filtration. The Colne Valley Company's supply was softened before delivery, and thus rendered suitable for washing. The East London Company's supply from a deep well at Chingford contained only a trace of nitrates or nitrites, and was much softer than either the Kent or Tottenham waters. Seen through a stratum 2 feet deep, the Kent, Colne Valley, Tottenham, and East London (deep-well) waters were clear and colourless; the Chelsea, Southwark, Lambeth, New River, and East London, clear and pale yellow; the West Middlesex and Grand Junction (Feb. 12) clear and yellow; and the Grand Junction on Feb. 5, opalescent and brownish yellow. The bacteriological examination by Dr. Koch's process of gelatine plate culture gave the following results: One cubic centimetre of each water collected in sterilized vacuous tubes, on the same days as the samples for chemical analysis (Grand Junction on Feb. 12), developed the following numbers of colonies of microbes: Kent, 20; New River, 74; West Middlesex, 104; Chelsea, 144; Grand Junction, 220; East London, 248; Lambeth, 284; and Southwark, 356. An ordinary tumbler contains about 250 cubic centimetres. This process is an exceedingly delicate test of the efficiency of filtration, both natural and artificial; and the efficiency may, *cæteris paribus*, be taken as inversely proportional to the number of microbe colonies."

Northern Coal Trade.—There has been rather a large inquiry for coal the last few days, owing to the desire to get supplies and shipments prior to the approach of the holidays. Best Newcastle steam coal is in good demand. About 12s. per ton, free on board, is paid; and all the collieries seem to have very full work. Second-class coals vary more in price; but trade is fairly good, and about 11s. per ton free on board is asked. For small steam coals, the price is about 4s. 6d. per ton. Gas coals are steady; the stoppage of some of the large collieries in the Sunderland district, owing to the strike, having reduced the supply for the past fortnight. The price varies very much; but from 9s. 6d. to 10s. per ton, free on board, may be given as the figure, except on contract. The local consumption is still very large. Coke is a little firmer; but best Durham qualities are quoted at from 17s. to 18s. per ton free on board, and the low price has its influence on the demand for gas coke, which is also a little affected in price in some cases.

Gas Exhibition and Cookery Lectures at Broadstairs.—A most successful exhibition of gas cooking and warming stoves and lighting apparatus was held at the New Assembly Rooms, Broadstairs, on the 3rd, 4th, and 5th inst.; lectures on cooking by gas being given twice daily by Mrs. C. Marshall, a former staff teacher at the National Training School of Cookery. The lectures were highly appreciated by good audiences each day. Messrs. J. Wright and Co., Limited, had a good display of gas cookers, fires, &c.; Messrs. W. Sugg & Co., Limited, exhibited a large quantity of their lamps and burners; and the "Meteor," the "Sun Carbon," and the "Schülke" lamps were also on view, as well as Sir J. N. Douglass's patent burners. Two gas-meters in glass cases were shown by the Gas-Meter Company; likewise Mr. Valon's prepayment meter. These were all at work, and attracted a great deal of attention. A number of chemical products from coal tar, &c., were exhibited by Messrs. Burt, Boulton, and Haywood. The arrangements were ably carried out by Mr. W. J. Latchford, the Company's Manager, and Mr. J. Ibbokon.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday.*

Now that the parliamentary fight upon the Edinburgh Railway Bills is over, it must be confessed that the Edinburgh and Leith Gas Commissioners have not made much of all their trouble. It may have been necessary to send someone to London to safeguard the interests of the Commission while they were being assailed at two points—in their works and in their offices—but to send a deputation to London large enough to negotiate, was surely the height of folly. It was folly on the part of the Commissioners who stayed at home, to delegate such powers to their more fortunate comrades who were basking in the light of a House of Lords Committee; but it was also folly on the part of the whole Commission to have delayed their negotiations till their adversary had already dragged them into court. No better terms, not probably so good, as they began to experience during the inquiry, could have been obtained in London than in Edinburgh; and their strange conduct in allowing the business to go to a Parliamentary Committee without attempting to come to terms, I can only attribute to a fondness which some of our public men have for appearing in London. The Caledonian Railway Company's Bill was thrown out by the Committee, which saves the Commissioners from further trouble on that point. As a matter of fact they never were called upon to lead a single line of evidence on the subject; and so far as this Bill was concerned, I am not far wrong in saying they did not require to leave Edinburgh at all, because they did not intend seriously to oppose it. It was otherwise with the North British Bill. Not having approached the North British Company in Edinburgh, it was necessary that they should watch over their interests in London. But what have they gained by what they did? The Bill has been approved by the Committee; but it does not bind the North British Railway Company to purchase the Edinburgh Gas-Works, nor does it provide for any particular mode of acquiring them. They are simply scheduled in the area which the Company may, if they choose, incorporate in their undertaking; and if they are to be taken by the Railway Company, it can only be by agreement. All that the Commissioners have secured is a clause providing that unless and until the Company shall acquire the gas-works and other property of the Gas Commissioners, the Company shall not, without the consent of the Gas Commissioners, in writing, take or interfere with the railway sidings of the gas-works, nor with the junction with the railway of the Company, or in any way interrupt the traffic to and from the works, without first providing an equally convenient access, to the satisfaction of the Gas Commissioners; nor stop up any street, road, or access to and from the works. That is not much; and if the Railway Company choose, they may make it altogether inoperative; because, though the service to the gas-works may be interrupted, it may be the exigencies of traffic which may be responsible for it. And so the Gas Commissioners may find themselves in the awkward plight, if the Railway Company should take up that attitude, of having their business seriously hampered; and may thus be concussed into coming to terms not by any means so favourable to the Commissioners as they might have secured when the Railway Company were angling for the support of the Corporation in the promotion of their Bill. The London correspondent of the *Scotsman*, on Wednesday, announced that, "so far as his information went, if the Railway Company would extend their offer to about £130,000, an arrangement might be come to." If there be any truth in this statement, I cannot understand such a manifest climb down on the part of the Commissioners. When the Edinburgh Gas Company proposed to remove their works to Niddrie, in their Bill of 1886-87, they agreed to pay £25,000 for the site of their projected new works. Then I cannot forget that when, in the midst of the controversy which arose over the provisional agreement for the transfer of the Edinburgh Gas Company's undertaking to the Corporations, Mr. John Romans, the veteran gas engineer, said he could erect new works for £150,000, he was universally ridiculed by all the gentlemen who then favoured the transfer. If then, a new site were to cost £25,000, and new works could not be erected for less than £150,000, while only £130,000 was got for the existing site, the Commissioners would be the losers by £45,000, a state of matters which they surely would never for a moment contemplate. Of course against the £45,000 would have to be placed the value of existing plant which could be transferred to the new works; but the Commissioners would have to bear the cost of transfer, which would be no light burden. Looked at in any way one likes, £45,000 is too much to drop upon the cost of the gas-works; and I can safely predict that the community will not regard with favour any set of Gas Commissioners who may trifle with their business in such a way as to let the Railway Company benefit at their cost. The Commissioners meet on Monday, when the subject is to be brought up; and it is to be hoped that a satisfactory explanation of the situation will be given.

The Edinburgh and Leith Gas Commissioners held their "annual meeting" yesterday. For what purpose the meeting is held, no one can say; but the Act of Parliament of the Commissioners says it must be held "on the second Wednesday of March, or within ten days thereafter." As a matter of fact, the meeting was held on the very last day possible; and the only business before it was the approval of a minute of the Works Committee arranging for the London business, which two minutes sufficed for. The Legislature must have meant that the meeting should serve a purpose; but they fixed it at the wrong season of the year. Had it been in July, business of a really "annual" nature could have been brought up; because then the accounts for the year might have been submitted. The Commissioners hold their monthly meeting on Monday, when the real business of the Commission will be transacted. They have a heavy programme of work before them. In addition to the question of the sale of the Edinburgh works, they have the question of the price of gas next year to determine. At present, the Engineers are busy preparing their reports on the estimates which have been submitted for the supply of coal. These, I understand, were opened on Monday by a Committee over which Mr. Wells presided; and precaution was taken, in view of complaints last year, that each estimate should be not only opened in presence of the Committee, but that the

terms of it should be there and then recorded. I learn that there is a general tendency towards a rise in the price of coal; but also that the higher qualities of coal do not show so large a rise, proportionally, as do the secondary and lower qualities. There is thus a probability that the Commissioners may resolve on restoring the illuminating power of their gas to the 27-candle power from which they reduced it last year, with, of course, an increase in the price. It would, from the circumstance above mentioned, seem as if an improved gas could be supplied at a small increase, but less than it could have been during the current year; and as there is a general desire in the community for a better quality of gas, it may be given. To supply even the present quality of gas, would require a rise in price; and if it could be improved for a very little more, it may be good policy to make an effort to accomplish it.

Aberdeen is not congenial soil for electric lighting. The Corporation last year procured a Provisional Order empowering them to supply electric light; and recently, as I have already informed your readers, steps have been taken towards its introduction. The Gas Committee of the Corporation have been entrusted with the arrangements; and they endeavoured to ascertain how many customers they were likely to have for the light, by sending out circulars to all gas consumers within the scheduled area whose bills amounted to more than £5 a year, asking whether they would be likely to adopt the electric light. Very cautiously worded, the circular stated that, "the works and apparatus for the production being of an expensive character, it is considered desirable, before proceeding further in the matter, to obtain information as to the quantity of electricity that would be required;" and explained that "a quantity of electricity sufficient to give the same amount of light compared with gas is estimated to cost about four times the price of gas." This was too much for Aberdonians; and no one can blame them. Were the subject put as straightly before every community, the answer would probably be the same as it has been in Aberdeen, where, out of a total gas rental of £4000, consumers representing £900 have not made up their minds, and only consumers representing £100 desire to have electric light. Clearly, in the face of this, it would be folly to go any further into the matter. When reporting the other week on the subject, Mr. Alex. Smith, the Gas Manager, stated that a revenue of £5875 would be required to make the electric lighting venture profitable; and thus, assuming that the consumers of £100 worth of gas paid £400, there would be a deficit of £5475 to be made up every year. Last year the Corporation had a surplus of £5499 upon the working of their gas undertaking (but three-fourths of that was swallowed up in improvements at the gas-works); and a surplus is scarcely looked for this year. The ratepayers would therefore have to make up this deficit of over £4000 upon electric lighting, unless the charge for electricity were to be increased by 12 times what is proposed, in which event probably the whole of the consumers of £100 of gas would withdraw their offer to take electricity. A better illustration of the *reductio ad absurdum* in commerce could scarcely be afforded than this state of matters in Aberdeen; but the incident points a moral in the other direction—viz., that if gas lighting is such a profitable venture as it is shown to be, and electricity is so costly as it is proved to be, where is the necessity for annoying a community over electric lighting? All other improvements or inventions, such as steam carriage, power-loom weaving, and the like, have recommended themselves on account of their being more economical than the existing processes; but electric lighting is being thrust upon an unwilling public on very opposite considerations.

Mr. P. Curran, who is credited here as being the organizer of the National Union of Gas Workers and General Labourers of Great Britain and Ireland, is at present in Scotland endeavouring to extend his organization in the large cities. So far as I can learn, though respectfully received, he has not made much progress in the way of securing twopences a week from gas workers here, who are a generally contented lot of men, being well treated and not likely to lend themselves to the seductions of the agitator. The visit is significant, however, as it indicates a desire to beat up funds for some forthcoming struggle, not in these benighted northern latitudes, but in some southern centre. It is in that respect that Mr. Curran is likely to encounter failure, because the men in Scotch gas-works, very sensibly, have never yet, and are not likely to subscribe towards the maintenance of agitation in other parts, which would not benefit them.

Mr. John Skinner, of Glasgow, has been appointed Superintendent of Mains by the Aberdeen Corporation Gas Commissioners, at a salary of £150 per annum. It was a condition of the appointment that applicants should possess a special knowledge of electrical engineering.

The Forfar Gas Corporation have advanced the salary of Mr. Esplin, their Manager, by £20 per annum. Mr. Esplin, it was stated, was one of the first in Scotland to abolish meter-rents; and he has been able to reduce the price of gas every year for the past five years. Another argument in favour of the increase was that it is eleven years since Mr. Esplin's salary was last adjusted; and since then the employees in the gas-works have had their hours reduced from 12 to 8, without deduction from their wages.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

The debate in the gas-engine action, which I referred to in last week's "Notes" as having been raised against the Glasgow Corporation Gas Commissioners, was opened before Sheriff Murray last Tuesday, by Mr. Bowers, from the Town Clerk's office, the gentleman who acts as Clerk to the Gas Committee. Mr. Bowers made a long statement on the subject which was listened to very patiently by the Sheriff, on account of the novelty of the case itself, and partly on account of Mr. Bowers' comprehensive manner of dealing with it, embracing extensive references alike to the Glasgow Corporation Gas Acts and others that might be supposed to have some bearing on the case in respect of one or other of the positions taken up by Mr. Bowers on behalf of the defenders. The continuation of the case was adjourned till the following day, when Mr. Samuel M. Carrick was to have replied to Mr. Bowers and stated the case from the pursuers' standpoint. The Glasgow newspapers of Wednesday afternoon and Thursday morning, all duly announced to their readers that the debate had taken place, and that the Judge had taken the case to avizandum. Now, the fact is, that the Sheriff was unable to spare time on Wednesday to hear the second half of the debate, which has still to come off; and consequently the case has not yet been taken to avizandum. I ought to mention that Sheriff Murray made extensive notes of the case as stated by Mr. Bowers; and it may therefore be confidently expected that the Sheriff's deliverance, when it comes, will be a very valuable one.

On Monday of this week, at a meeting of the Special Committee of the Glasgow Corporation on Electric Lighting, the tenders submitted for the lighting of the compulsory area scheduled under the Glasgow Electric Lighting Provisional Order were opened and cursorily examined. Only four tenders had been put in; and it seems that only two of them were made up in such a way as to be of any service in helping the Committee towards concluding a contract. The offerers in these two cases were Messrs. Muir, Mavor, and Coulson, and Messrs. R. E. Crompton and Co., of Chelmsford and London. The first-named firm have long had in regular work two central stations in Glasgow, and have as a large portion of their work the lighting of the General Post Office and the new municipal buildings or City Chambers. In the latter, there is included the gas rental pay department; and the somewhat strange anomaly appears of electric lamps over the counter where the gas consumers pay their periodical accounts. It may be remembered in connection with the tender of the other firm that I have named, that some months ago Mr. Crompton himself was brought in by the Corporation Gas Committee (acting, doubtless, on the advice of Mr. Foulis), to inspect and report upon the compulsory area, and advise with them as to what should be done towards carrying out the terms of the Provisional Order. Up to the present, nothing further has been done in regard to either of these two tenders. Instead, the members of the Electric Lighting Committee have resolved to pay a visit to Bradford and Leeds, with the view of personally inquiring on the spot as to what has been done, or has been resolved on, in the way of providing and selling electric light in those two towns. Starting on Monday morning, the deputation will consist of six or seven members of the Special Committee; and they will be accompanied by Mr. Foulis as their only expert. Of course, there may be some advantages in making inquiry "on the spot," by one body of municipal governors holding personal converse with another band of "brothers-in-trade;" but I feel confident that the perusal of certain contents of the JOURNAL for some months back would be of great assistance to them, either along with or without their trip to Yorkshire. It is unfortunate that the Convener of the Finance Sub-Committee of the Gas Trust, the very person who proposed this visit to Bradford and Leeds, will not be able to accompany his colleagues, owing to an engagement in London with the Chancellor of the Exchequer at the same time.

On Tuesday of this week, at the monthly meeting of Greenock Police Board (the local Gas Trust), the Convener of the Gas Committee reported that in accordance with the authority given to them at the last meeting of the Board, they had taken offers for a new gasholder to be erected at Inchgreen Gas-Works; and that they had accepted the lowest of the tenders, the one which they considered the most eligible—namely, that of Messrs. Hanna, Donald, and Wilson, of Paisley, who had formerly to do with the construction of the works at Inchgreen. The accepted offer was £6000.

In order to provide for the payment of the cost of the Pollokshaws and Partick, Hillhead and Maryhill Gas-Works, and for certain extensions that are in progress or contemplated, the Glasgow Corporation Gas Committee are preparing for an increase in the Corporation Loans Fund to the extent of half a million pounds sterling.

A considerable extension of the street-mains has been resolved on by the Gas Authority of the Burgh of Gourock. The gas-supply undertaking of this seaside burgh is proving to be very successful in the hands of Mr. M'Ewan, the Manager.

The Police Commissioners of Lockerbie, a small Dumfriesshire burgh, are now negotiating with the local Gas Company for the acquisition of their works, plant, &c.

Scotch pig iron warrants changed hands on Monday at 45s. per ton cash; and yesterday the price declined to 43s. 3½d. per ton, The closing price, however, was 43s. 6d.; thus showing for the week a fall of 1s. 6d. per ton. The market has been very flat all the week. It is said there is no special reason to account for such a heavy fall, but business is dull and speculators are operating for a further fall.

Values in the local coal trade have continued to ease during the week; the output of material being rather in excess of the demand. Some sellers have been pressing their coal on the market with more persistency this week, with the result that prices have generally fallen away to the extent of 3d. per ton. Main coal is quoted at 8s. 9d. per ton f.o.b., and ell coal at 9s. 3d. to 9s. 9d. per ton. Very shortly an effort will be made to reduce miners' wages.

Extensions at the Westhoughton Gas-Works.—The Directors of the Westhoughton Gas Company have just put in hand the construction of a new telescopic gasholder, 80 feet in diameter, in two lifts, capable of being extended to about 42 feet, and to contain when filled upwards of 200,000 cubic feet of gas. This additional storeage is part of the extensions now in progress at the works.

Richmond (Surrey) Water Supply.—At a recent meeting of the Richmond Town Council, the Water and Baths Committee presented a report, in the course of which they recommended the Council to apply to the Local Government Board for sanction to raise a further loan of £3000 for continuing the adits and other works at the Terrace Gardens well, in order to extend the former to the old well and water-works, when the pumping there would, it was stated, do all the work of the town, and at the same time provide storeage for about 300,000 gallons of water; the loan to be taken up in sums as and when required. Alderman Piggott, in moving the recommendation, said the Council had spent about £9000 on this well up to the present time, and were realizing about £1800 a year from it. The whole cost of the water supply had been £70,000 to £80,000, and the returns were £10,800 a year. He thought, therefore, that the ratepayers might feel that the money had been laid out to advantage. Alderman Gascoyne remarked that by the time the work was completed it would probably enable the Committee to reduce the rates by about 8d. in the pound. The report was adopted.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 21.

Sulphate of Ammonia.—There has not been quite so much activity this week. This circumstance appears but natural; as after the excited buying of a week ago, it was not likely that the requirements would be quite so pressing this week. Those who know the trade are well aware that buyers when they have covered their urgent necessities, usually pause in the hope of being able to make better bargains by looking on for a while. This does not, however, do away with the fact that a further improvement is still in prospect, as soon as foreign consumers are forced to complete their purchases, and which from various symptoms cannot be delayed beyond the early part of April. The movements of several dealers on this side also indicate that they themselves are still in need of spot parcels. Makers have generally been able to obtain £11 10s. f.o.b. Hull; and although some second-hand parcels were placed upon the market and sold at £11 7s. 6d. to £11 8s. 3d. for March delivery, there is not much obtainable thereat. At both Hull and Liverpool, at all events, sulphate cannot be bought to-day below £11 10s. from first hands; indeed for delivery here, above £11 10s. has repeatedly been paid—showing that the American and Spanish demands are still very active, and fully equal to the production. In fact, the shipments from the northern ports have been considerably above the average for weeks past, and are greatly taxing the present make. Some doubt has been thrown upon the reports of forward business in Scotland. Be this as it may, German consumers have paid (for delivery up to June) prices which are based upon the highest figures said to have been obtained by Scotch makers. As regards nitrate, there have been some extraordinary fluctuations in the Hamburg market, stimulated by a "bear" clique at bay. But there has been a sharp recovery; and 9 marks is again to-day's quotation. Here the market is very steady, at 9s. 3d. per cwt.; and a decline is not anticipated at present.

LONDON, *March* 21.

Tar Products.—The weakness in benzols has been accentuated during the past week; and business is difficult even at 4s. 5d. for nineties, and 3s. 3d. to 3s. 2d. for fifties. Anthracene is nominally firmer, although there are not many transactions reported. Pitch continues to fetch good prices; and the probability is that something approaching present values may be maintained. Creosote and oils show but little variation from last week's position. Crude carbolic is, if anything, quieter, with but little prospect of any immediate improvement. To-day's prices are: Tar, 24s. to 28s., according to position. Pitch, London, 33s. 6d.; country, 31s. 6d. Toluol, 1s. 11d. Solvent naphtha, 1s. 9d. Crude naphtha, 1s. 8d. Creosote, 2d. Heavy oil, 2d. Crude carbolic, 60's, 1s. 5d. Cresol, 9d. Anthracene, "A" quality (30 per cent.), 1s. 3d.; "B" quality, 1s.

Sulphate of Ammonia is decidedly better; and with nitrate so much improved, the higher prices for sulphate are not likely to recede. Ammoniacal liquor, according to position and strength, is quoted 5s. 9d. to 7s. 6d.

Sales of Shares.—At Preston, last Wednesday, several shares in the *Newcastle and Gateshead Water Company* were offered for sale, with the following result: £200 5 per cent. preference shares sold for £300; and £350 of ordinary stock, for £790.——A £50 share in the *Rochester, Chatham, and Strood Gas Company*, was sold a few days ago for £114; and several £5 shares in the *Brompton, Chatham, and Rochester Water Company* for £14 10s. and £14 17s. 6d. each.——Last Wednesday, 60 £10 shares in the *Worksop Water-Works Company* were sold locally by auction at £12 2s. 6d. and £12 5s. per share.

Cheap Gas and Pure Air for Manchester.—The Noxious Vapours Abatement Association of Manchester are again drawing public attention to the price charged for gas in the city. It is stated that "profits amounting to nearly £90,000 were last year made by the Gas Department; and for the year ending on the 31st inst., a similar profit will doubtless be realized, which, as at present intended by the Council, will be transferred to the city fund, and used for purposes in which the gas consumers are not specially interested. This has the effect of putting a tax on gas, and prevents people using it largely instead of coal for heating purposes." It is proposed to ask the Corporation to sell gas in Manchester at cost price (after deducting interest, renewals, repairs, and providing for the sinking fund), with a view to encouraging its more general use for heating purposes, and so preventing the great pollution of the air which is at present going on. If a sufficiently strong feeling should be shown to exist in favour of it, the Mayor will be asked to call a meeting to consider the matter. The opinion of the ratepayers would then be taken on the question of the advisability or otherwise of transferring from the Gas Department to the city fund profits derived from the manufacture and sale of gas and residual products; and also of charging for gas at cost price.

The Leeds Gas Committee and their Men.—Some misunderstanding appears to have arisen between the Gas Committee of the Leeds Corporation and the workmen in their employment, in regard to the precise interpretation of one of the rules. The whole matter is the outcome of the recent dispute. It is said that, when the dispute was settled, there was a tacit understanding that the question of custom should be definitely recognized in the rules. At last Thursday's meeting of the Committee, it seems, a resolution bearing on the subject was proposed, and was discussed at some length; but the Gas Managers being unfavourable to the proposition, the Committee's decision was postponed, and consideration of the matter was adjourned to another meeting. The question of fixing weighing-machines in the retort-houses for weighing out the 60 cwt. of coal which the men are expected to carbonize at every shift, was also brought forward; but it was stated that the system would be impracticable, except in one retort-house at the New Wortley works. Another matter which the Committee had under consideration was the case of the man Edward Garside, who, it will be remembered, was killed a short time ago by an accident which occurred in the yard of the New Wortley Gas-Works. It was decided to make a grant of £25 to the deceased's family, in addition to small sums which have been already given, amounting to £20.

Increased Gasholder Capacity at the Lymm Gas-Works.—Messrs. W. C. Holmes and Co., of Huddersfield, have been entrusted with the telescoping of a gasholder at the Lymm Local Board Gas-Works, for which tenders were invited in our advertisement columns a few weeks ago.

The Public Lighting of Newcastle.—At a meeting of the Newcastle Watch Committee last Friday, it was decided to send a deputation to wait on the Gas Company, requesting them to allow 10 per cent. discount on the Corporation account for lighting the streets with gas during the whole of the year.

Lancashire Coal Trade.—There has been a slight improvement in the coal trade; and prices are steadier for most descriptions. House coal and a medium quality of gas coal have been in fairly good demand; but burgy and inferior sorts of slack still drag upon the market. At the pit's mouth, best house coal is 12s. 6d. per ton; seconds, 10s. 6d. to 11s.; and common round, 9s. to 9s. 6d. Burgy averages 7s. 6d. to 7s. 9d.; and slack ranges from 4s. up to 6s. 6d., with 7s. as an outside figure. Steam coal for shipment is quoted at 10s. to 10s. 6d. per ton.

Bristol Water Company.—The report of the Directors of this Company states that the revenue from water-rates for the past year was £89,059; being an increase of £3622 over that of the previous year. The sum shown by the revenue account to be applicable for division is £21,775; and the Directors recommend that a dividend of 4½ per cent. on the ordinary £25, £20, £6, and £4 10s. shares be declared, making, with the intermediate payment of 4½ per cent., 8¾ per cent. for the year, and leaving £2905 to be carried forward. The rainfall during 1890 in the neighbourhood of Bristol was 9 inches less than the average of the previous 26 years—a deficiency of 23 per cent. Notwithstanding this, the constant supply of water to the whole of the Company's district was maintained. The whole of the issue of £50,000 of 7 per cent. maximum ordinary stock has been taken at an average price of £140 13s. 3d. per cent. The capital expended during the year was £96,960; and the length of mains laid was about eight miles.

Tampering with a Gas-Meter.—At Warrington, last Friday, William Woods was charged with having on the 12th inst. wilfully and fraudulently injured a gas-meter to the amount of 5s., contrary to the provisions of the Warrington Gas Act of 1871. Mr. J. L. Whittle, the Town Clerk, prosecuted, and said that criminal proceedings were not instituted because the defendant's wife had been ill for a period of six months. A new meter was fixed at defendant's shop; and on Jan. 20 it was seen all right, but on the 12th inst., Robert Leigh, a meter inspector, found five holes punched in the top above the dials and a piece of wire driven in the cog-wheels. It was a clumsy contrivance; for it stopped the supply of gas, and for whatever reason the wire was put in, the Corporation were not defrauded. Evidence in support of this statement having been given, defendant said he had not tampered with the meter, which had been injured by a boy in his employ. The meter stood in a conspicuous position in the shop, and could be seen by anyone on entering. A fine of £2 and costs and 5s. damage was imposed.

New Pumping-Engines for the Cambridge Water Company.—The formal ceremony of starting two powerful pumping-engines at the Fulbourn works of the Cambridge University and Town Water Company took place yesterday week. The engines are both capable of raising a million gallons of water per day; and they are described as being a pair of high-pressure, expansive, condensing, beam pumping engines, with 27-inch cylinders, having a 5-feet stroke, and 16-inch bucket and plunger pumps. The fly-wheels are 18 feet in diameter; and they will work at a speed of 20 revolutions per minute. The whole of the valve gear is made of burnished crucible steel. The engines were constructed by the Lilleshall Engineering Company, Limited, and are named after the Chairman and Vice-Chairman of the Company (Dr. Perowne and Mr. Adams). Among those present at the ceremony, were the Mayor (Mr. Alderman Wace), Dr. Perowne, Mr. W. Peed (the Secretary of the Company), Mr. W. W. Gray (the Manager), and Mr. C. Hawksley.

The Bramley and District Gas and Water Scheme.—On Friday, the 13th inst., Major Marindin held an inquiry, on behalf of the Board of Trade, into an application made to them for a Provisional Order to enable a scheme of gas and water supply to be carried out for Bramley and other places. Mr. J. Shiress Will, Q.C., M.P., appeared for the promoters, and explained that the application was in respect of an area which included Bramley, so far as gas was concerned, but not water; and Wonersh, Shamley Green, St. Martha's-on-the-Hill, and Albury, for both gas and water. The principal opposition to the site of the gas-works came from a Mr. Renton, on the ground of its proximity to his residence; but the promoters were ready to do whatever they could to diminish all cause of objection on his part. He (the learned Counsel) believed, from the position of the works and the modern system of manufacture it was proposed to adopt, that there would be scarcely a perceptible smell from them. Mr. C. H. Sparks, C.E., gave details of the scheme. The total population of the entire district he took at 3299, and he assumed that 2500 of them would take water. The reservoir he proposed would hold 120,000 gallons—two days' supply for the population, at 25 gallons per head. His estimate of the cost of the water scheme for the home district (Wonersh and Blackheath) was £2680, and to extend it would require £2295 extra—£4975 altogether. He expected a gross revenue on the water of £600; and from this he deducted £100 a year for working expenses. He reckoned that the total cost of the gas scheme would be £14,074, or, for the home district only (Bramley and Wonersh), £7349. The gross revenue he put at £2197; the cost of production at £1325—leaving a net revenue of £872. Mr. J. Rickson, Manager of the Cranleigh Gas-Works, said there might be a little smell from the proposed gas-works, but nothing injurious or disagreeable to anyone. After some further evidence, the case for the promoters closed. Mr. R. M. Bray, who appeared on behalf of Mr. Renton, then called Mr. J. Quick and other witnesses in opposition to the scheme; their evidence being to the effect that it was not required, and that the proposed works would spoil the beauty of the whole neighbourhood. Mr. Bray protested against strangers being allowed to spoil the country and depreciate the value of gentlemen's property, simply for the sake of speculation. The inquiry then terminated, having lasted seven hours.

Anglo-Romano Gas Company.—The dividend recently declared by this Company was £1 12s. 9d. per share, not £1 10s. 3d. as previously announced.

Claim for Damage to Electric Lighting Poles and Wires in New York.—It is reported that the Brush Electric Illuminating Company and the United States Electric Lighting Company have begun actions against the New York municipal authorities for damages to their poles and wires. The former ask for $525,000; the latter for $550,000.

Long Eaton Water Supply.—The Long Eaton Local Board have already decided to apply to the Local Government Board for sanction to the borrowing of £2500 for water-works purposes; but, in view of the advanced position of the scheme, it has been determined to ask for £20,000—repayment to be spread over as long a term as possible.

Bangor (Co. Down) Water Supply.—The Engineer of the Bangor (Co. Down) Town Commissioners, Mr. H. Chappell, has propounded a scheme by which provision will be made for storing 28¼ million gallons of water, which, together with the storeage of the existing reservoir, will give 16 gallons per head of 20,000 inhabitants for 151 days. The project, which has been approved by the Commissioners, will cost, it is estimated, £5898.

The Gas Supply of Philadelphia.—The report of the Gas Bureau of Philadelphia for the past year gives as the total receipts $3,659,644—an increase of $1419 over the previous year. The expenditure was $2,851,019; being a decrease of $84,751. The total quantity of gas made was 3312 million cubic feet in 1890, as against 3151 million cubic feet in 1889. The cash profits for the year amounted to $893,376. Adding to this $862,810 for 575,206,872 cubic feet used by the city departments, at $1·50 per 1000 cubic feet, makes the total profit for the year $1,656,180—an increase of $128,482 over the year 1889.

Windsor Corporation Water Supply.—The Windsor Town Council, at a recent special meeting, resolved to borrow on water-works account a further sum of £4000 by the issue of 3 per cent. debenture stock to pay for three new turbines and to meet other expenditure on capital account; and with regard to their opposition to the London Water Commission Bill, they gave instructions to the Town Clerk "to concur in any arrangement with other corporations and public bodies having identical interests to protect, in employing one set of Counsel, or, if such arrangement could not be carried out, to retain Counsel to oppose on behalf of the Corporation."

The Matlock Local Authorities and the Gas Company's Order.—At a recent meeting of the Matlock Bath Local Board, a report was presented by the deputation who accompanied the Clerk (Mr. Lymn) to London to oppose the application of the Matlock and District Gas Company to the Board of Trade for a Provisional Order. The result showed that the Matlock Bath Board opposed in respect to that portion of their district affected by the application; and Mr. Courtney Boyle reduced the standard price for gas from 4s. 6d. to 4s. 3d. per 1000 cubic feet, and the application for additional capital from £16,200 to £8000. Before the case came on for hearing, the Company offered to reduce the standard price to 4s. 4d. and pay the costs; but this was refused in the interests of the ratepayers. Mr. Clark said it was a great waste of the ratepayers' money, as the matter could have been settled easily without going to the Board of Trade. The money they had spent would take 20 years to repay, so far as they were affected by the Company's application. The report was adopted, and a vote of thanks accorded to the deputation.

Tynemouth Gas Company.—At the meeting of this Company to-day, the Directors will submit a report for the year ending Dec. 31 last which shows that the revenue amounted to £25,156, and the expenditure to £19,191; and after writing off £465 for depreciation on meters, stoves, &c., a balance remains of £5498. An interim dividend of 5 per cent. on the original capital and 3½ per cent. on the new share capital was paid on Sept. 1 last, amounting in all to £2859; and it is proposed to make a similar payment for the past half year. These together amount to £5718; so that £219 will have to be taken from the undivided profit. The report further states that sulphate of ammonia has produced considerably less in the past year, owing to the fall in value, and that coal and labour show a very large increase in cost. On the other hand, however, there has been a substantial increase in the receipts from gas, coke, and tar. With the idea of fostering the use of gas for lighting, heating, and cooking purposes, the Directors have in hand a scheme for altering the present offices, and making a show-room in which they will exhibit a variety of the latest gas appliances.

The Price of Gas at Heckmondwike and Liversedge.—At the meeting of the Heckmondwike Local Board on Monday last week, it was reported that a deputation representing the Heckmondwike and Liversedge Local Boards had waited upon the Directors of the Heckmondwike Gas Company with a view to a reduction in the price of gas in Heckmondwike and Liversedge. Mr. Redfearn, who spoke on behalf of the Heckmondwike section of the deputation, said they compared the price with the lesser rates charged by other companies having similar liabilities, and he also pointed out that for the two years ended June 30, 1890, the Company had made nearly £1900 profit more than the sum required to enable them to pay their full dividends and the interest upon the share capital. It was urged by the Company that the increased price of coal would seriously affect the expenditure; but the deputation replied that the Company could recoup themselves in this respect out of the accruing excess of profits, while a reduction of 5d. per 1000 cubic feet—allowing a decrease in the revenue at the rate of £1000 per annum—could be recouped out of the £1900 extra profit already accumulated. Mr. Heaton, on behalf of the Liversedge Board, urged that, failing to make a general reduction in the price, the Company ought to consider the interests of the poorer portion of the local community by reducing the price at least 5d. per 1000 cubic feet to cottagers, and if they did this the public would feel grateful. It was also reported that the Company's leakage was substantially decreasing—a circumstance which accounted for the excess profits of the past two years, though formerly the loss of gas was at the rate of nearly one-fourth of the total quantity made. Mr. Redfearn concluded by expressing his belief that the Company would eventually endeavour to meet the wishes of the deputation by making a reduction in some shape or another.

Improved Position of the Huddersfield Corporation Water Undertaking.—At last Wednesday's meeting of the Huddersfield Town Council, the satisfactory announcement was made by Mr. Alderman Brigg that, for the first time in the history of the Corporation water undertaking, there was now a balance to go to the relief of the rates; and he was authorized to hold out the hope that before very long there might be a reduction in the charges for water both to manufacturers and to domestic users.

The Rateability of Turf-Covered Reservoirs.—A dispute between the Stowmarket Local Board and the Water Company, as to the rateability of a reservoir covered with turf, has just been settled. The amount in question was not great, but the point raised was an interesting one. The Company, it appears, is rated at £40 10s. on the reservoir, and at £36 on the mains. They have hitherto paid rates on the full assessment; but they now contend that they are entitled to a rebate of 75 per cent. off the district rate on the reservoir portion. To settle the matter, the opinion of Mr. Glen was taken, in the course of which he said that the question appeared to him to depend upon whether the whole structure was to be regarded as land covered with water, together with a building above it, or merely as a building which contained water. He thought the Company were entitled to the reduction on the value which the reservoir would have without the roof and walls supporting it, but not on the value of such roof and walls as a shelter to the reservoir. He admitted, however, that it was quite possible to look upon the reservoir with its roof as a building with water in it, which was not entitled to a reduction. If the roof were taken off, there was, he thought, no doubt that the Company would be entitled to the reduction claimed. This opinion the Company and the Local Board both claimed to be in their favour; and after some discussion the matter was referred by the latter to the consideration of Mr. J. Gudgeon, to hear whose opinion the members were specially summoned together last Friday week. Mr. Gudgeon quoted decisions of the Court of Queen's Bench in support of his view that the Company were entitled to the rebate. He strongly advised the Board not to contest the case, when, for the sake of getting £4 a year, they ran the risk of losing something like £250 in costs. After hearing this further opinion, the members of the Board passed a resolution allowing the rebate of 75 per cent.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 512.)

Issue.	Share	When ex-Dividend.	Dividend or Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	10 Oct.	10½	Alliance & Dublin 10 p. c.	10	16½—17½	+½	6 0 0
100,000	10	,,	7½	Do. 7 p.c	10	12½—13½	+½	5 11 1
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	106—108	..	4 12 7
100,000	20	27 Nov.	8	Bahia, Limited	20	15—17	..	9 8 3
200,000	5	13 Nov.	7½	Bombay, Limited	5	6¾—7¼	..	5 3 5
40,000	5	,,	7½	Do. New	4	5—5¼	..	5 9 1
380,000	Stck.	26 Feb.	12½	Brentford Consolidated	100	212—217	..	5 12 10
125,000	,,	,,	9½	Do. New	100	153—158	..	5 17 1
220,000	20	12 Mar.	11½	Brighton & Hove Original	20	39—41	..	5 12 2
320,000	20	28 Mar.	11½	British	20	44—46	..	4 17 10
50,000	10	12 Mar.	11	Bromley, Ordinary 10 p. c.	10	18—20	..	5 10 0
39,000	10	,,	8	Do. 7 p. c.	10	13—15	..	5 6 8
328,750	10	13 Nov.	6	Buenos Ayres (New) Limited	10	10—11	..	5 9 1
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	100—103	..	5 16 7
150,000	20	26 Feb.	8	Cagliari, Limited	20	25—27	..	5 18 6
550,000	Stck.	10 Oct.	13½	Commercial, Old Stock	100	255—260	+2	5 5 9
130,000	,,	,,	10½	Do. New do.	100	198—203	..	5 5 11
130,000	,,	30 Dec.	4½	Do. 4½ p. c. Deb. do.	100	120—125	..	3 12 4
557,320	20	30 Dec.	13	Continental Union, Limited	20	48—49	..	5 6 2
242,680	20	,,	13	Do. New '69 & '72	14	32½—33½	..	5 8 5
200,000	20	,,	10	Do. 7 p. c. Perf.	20	37—39	..	5 2 6
75,000	Stck.	25 Sept.	10	Crystal Palace District	100	200—210	+5	4 15 3
486,090	10	28 Jan.	4†	European, Limited	10	19½—20½	..	—
354,060	10	,,	4†	Do. Partly paid	7½	14—15	..	—
5,470,630	Stck.	12 Feb.	13	Gaslight & Coke, A, Ordinary	100	238—242	—2	5 7 5
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	96—99	..	4 0 10
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	247—252	..	3 19 4
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	118—123	..	4 1 3
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	174—179	..	4 3 9
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	161—165	..	4 4 10
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	246—251	..	3 19 8
476,000	,,	,,	—	Do. K, 6 p. c. Prf.	100	148—153	..	3 18 5
1,061,150	,,	12 Dec.	4	Do. 4 p. c. Deb. Stk.	100	113—118	..	3 7 10
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	122—126	..	3 11 5
908,000	,,	,,	6	Do. 6 p. c. do	100	165—170	..	3 10 6
3,800,000	Stck.	13 Nov.	12	Imperial Continental	100	228—232	..	5 3 5
75,000	5	12 Dec.	6	Malta & Mediterranean, Ltd.	5	5—5½	..	5 9 1
560,000	100	1 Oct.	5	Met. of Melbourne, 5 p. c. Deb.	100	112—115	..	4 6 11
541,920	20	27 Nov.	6½	Monte Video, Limited	20	18—19	..	6 16 10
150,000	5	27 Nov	10	Oriental, Limited	5	8¾—9¼	..	5 8 1
60,000	5	25 Sept.	7	Ottoman, Limited	5	5—5½	..	6 7 5
166,870	10	26 Feb.	2	Pará Limited	10	3¾—4¼	..	—
420,000	100	3 Nov.	6	People's Gas of Chicago—1st Mtg. Bds.	100	95—100	..	6 0 0
500,000	100	1 Dec.	16	2nd Do.	100	93—98	..	6 2 5
150,000	10	10 Oct.	10	San Paulo, Limited	10	16—17	..	5 17 8
500,000	Stck.	26 Feb.	15½	South Metropolitan, A Stock	100	277—282	..	5 9 11
1,350,000	,,	,,	12	Do. B do.	100	230—235	+2	5 2 2
166,500	,,	,,	13	Do. C do.	100	237—242	+2	5 7 5
678,000	,,	30 Dec.	5	Do. 5 p. c. Deb. Stk.	100	140—145	..	3 9 0
60,000	5	12 Mar.	11½	Tottenham & Edm'nton, Orig.	5	11—13*	..	4 8 5
						*Ex div.		
				WATER COMPANIES.				
729,221	Stck.	30 Dec.	10	Chelsea, Ordinary	100	269—274	..	3 13 0
1,720,560	Stck.	10 Oct.	8a	East London, Ordinary	100	216—220	—2	3 12 9
544,440	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	140—145	..	3 2 0
700,000	50	12 Dec.	9	Grand Junction	50	120—125	..	3 12 0
708,000	Stck.	12 Feb.	10½	Kent	100	275—280	..	3 15 0
1,043,800	100	30 Dec.	9½	Lambeth, 10 p. c. max.	100	253—258	—1	3 13 8
406,200	100	,,	7½	Do. 7½ p. c. max.	100	197—202	..	3 14 3
260,000	Stck.	25 Sept.	4	Do. 4 p. c. Deb. Stk.	100	121—126	..	3 3 6
500,000	100	12 Feb.	12½	New River, New Shares	100	357—362	..	3 6 21
1,000,000	Stck.	28 Jan.	4	Do. 4 p. c. Deb. Stk	100	125—127	..	3 2 6
902,300	Stck.	12 Dec.	7	S'thwk & V'xhall, 10 p. c. max.	100	175—180	..	3 17 9
126,500	100	,,	7	Do. 7½ p. c. do.	100	168—173	..	4 0 11
1,155,066	Stck	12 Dec.	10	West Middlesex	100	263—268	—2	3 14 7

† Interim dividend. a Next dividend will be at this rate.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams:
"GWYNNEGRAM LONDON."

TELEPHONE No. 2698.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

Thirty-three Medals at all the Great International Exhibitions have been awarded to GWYNNE & Co. for Gas Exhausters, &c.

They have completed Exhausters to the extent of 29,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH-SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.

Their Exhausters can be made, when desired, on their New Patent Principle, to pass Gas without the slightest oscillation or variation in pressure.

Catalogues and Testimonials on application.

Exhausting Machinery at Fulham and Bromley Gas-Works—each set passing 400,000 cub. ft. per hour, drawing 14 miles distant from Beckton.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST OST on SATURDAY.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

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JOHN ROMANS & SON, EDINBURGH. Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, } SCOTLAND.
NEWTON GRANGE, NEAR DALKEITH, }

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 85, Gracechurch Street, LONDON; 70, Wellington Street, GLASGOW; 58, Fountain Street, MANCHESTER; and 96, Reade Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.
Head Office: MIDDLESBROUGH. Correspondence invited.

TAR and Liquor wanted.
BROTHERTON AND CO., Commercial Buildings, LEEDS.

ASSISTANTSHIP Wanted in Gas-Works or Gas Engineering concern. Fair Draughtsman, Analytical Chemist and Engineer. Age 26, strong, and active. Can work and direct work.
Address No. 1929, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Working MANAGER in a Gas-Works making from 7 to 20 million cubic feet per annum. Has had good practical experience in Carbonizing, Fitting, Main and Service Laying, Reading and Testing Meters, and Repairs connected with Gas Plant. Good testimonials and references. Abstainer. Married.
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WANTED, a Working Manager for a Country Gas-Works. Yearly make, 1¼ to 2 millions. Required to do all work, including Service laying, taking Meters, collecting Accounts, &c. Wages 25s. per week, with House, Coal, and Gas.
Apply to the SECRETARY, Gas-Works, Milnthorpe, WESTMORELAND.

THE Directors of the Longwood Gas Company, near Huddersfield, require at once a competent Man, who has a thorough knowledge of the Manufacture and Distribution of Gas, as MANAGER and SECRETARY of their Works (producing about 50 million cubic feet per annum).
Applications, in own handwriting, stating age, qualification, and salary required, accompanied with *copies* of testimonials, to be addressed to the Chairman, E. Armitage, Esq., New Street, Huddersfield, on or before March 26.

JAMES LAWRIE & CO. supply Best SCOTCH CANNEL COALS, Best FIRE-CLAY RETORTS, BRICKS, TILES, and LUMPS; BOILER SEATING BLOCKS, FLUE COVERS, and SILICA BRICKS for SPECIAL FURNACE WORK; COKE BARROWS, BOGIES, and SMALL WAGONS.
Postal Address: 1, WHITTINGTON AVENUE, E.C.
Telegram Address: "EIRWAL LONDON."

W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON, Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. 574 of this week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock, Oldham."

COZE'S Automatic Apparatus for CHARGING AND DISCHARGING GAS-RETORTS. For Illustrated Advertisement of this System, see p. 421.
Inquiries should be addressed to THE AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED, 86-88A, LEADENHALL STREET, E.C.

WANTED, at once, a Steady Man as NIGHT STOKER and to make himself generally useful, for a small Gas-Works. Wages £1 per week.
Apply to J. SLINGSBY, Manager, Gas-Works, STONY STRATFORD.

TO GAS STOKERS.

WANTED, at once, a steady and trust- worthy GAS STOKER. Must be used to Engine and Exhauster and Shovel Charging. None but smart, powerful men need apply. Average wages 28s. per week.
Apply, stating age and experience, and giving references, to the MANAGER, Gas-Works, HALESOWEN.

WANTED, a small Oxide of Iron PURIFIER, with Wood or Iron Grids.
State size and price to WM. BROTHERS, Carbonate and Liquor Ammonia Manufacturer, Rawtenstall, LANCASHIRE.

WANTED, to purchase Gas Carbon delivered at nearest Station to Gas-Works, in quantities of not less than 4 tons.
Address stating price per ton and quantity, No. 1766, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Winslow New Gas Company, One second-hand CAST-IRON TANK suitable to hold about 3000 gallons of TAR (about 12 ft. by 8 ft. by 5 ft.).
Address, stating price, J. HILL, Manager, Gas-Works, WINSLOW.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. OXIDE PAINT, SULPHURIC ACID, & Chemicals.
120 and 121, NEWGATE STREET, LONDON, E.C.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

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MANCHESTER ELECTRICAL STORES.

FOR Batteries, Bells, Wires, and Special Electrical Apparatus, address the best house
17, NEWTON STREET, PICCADILLY, MANCHESTER.

WANTED, a small 1-horse power Gas- ENGINE and GAS EXHAUSTER (5000 feet per hour).
Address, stating price and conditions, No. 1927, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—Two Purifier "Lifting Travellers" for 12 feet Square Boxes. Equal to new. Messrs. Cockey and Sons makers.
Apply to the GAS-WORKS, JERSEY.

FOR SALE, Cheap—The Ironwork on a Stack of Three Beds of Fives—Fifteen O MOUTHPIECES, 18 in. by 5 in. complete, HYDRAULIC, ASCENSION-PIPES, BUCKSTAVES, TIE-RODS, AND DOOR-FRAMES. No reasonable offer refused.
Further particulars on application to Mr. A. GRAHAM, Gas Company, HEBDEN BRIDGE.

CITY OF CHICHESTER GAS COMPANY.

FOR SALE—A Second-Hand Anderson's Patent STEAM-ENGINE and EXHAUSTER combined, on Base-Plate, with 6-inch connections. Taken down last season to make room for larger one of same make. Price £25, or offers.
Full particulars may be obtained of R. S. CHURCH, Manager, Gas-Works, CHICHESTER.

FOR SALE—One Single-Lift Gasholder, 50 feet diameter, 16 feet deep.
Four PURIFIERS, 16 feet square, 5 feet deep, with Covers, Valves, Connections, Sieves, Lifting Apparatus, &c., complete.
One VERTICAL PIPE CONDENSER, 10-inch pipes.
One CAST-IRON SCRUBBER, 7 feet diameter, 20 feet high.
The above are all in excellent condition, only removed to find place for larger Plant.
Full particulars on application to No. 1923, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

RUGBY GAS-WORKS.

FOR SALE—A Second-Hand Exhauster (Anderson's Patent), with 10-inch Bye-Pass and Connections, capable of passing about 15,000 cubic feet per hour; also Boiler, &c. Has been at work till this season, and may be seen at Rugby.

Particulars may be obtained from Mr. P. SIMPSON, the Manager.

TO BOILER MAKERS.

THE Sheffield United Gaslight Company invite TENDERS for the manufacture and delivery to their Neepsend Works of Four LANCASHIRE STEEL BOILERS, each 30 ft. long by 7 ft. diameter.

A copy of the drawing and specification, with form of tender, may be obtained from Mr. Fletcher W. Stevenson, the Company's Engineer, on payment of 10s. 6d.

The Directors do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked "Tender for Boilers," must be delivered, addressed to the undersigned, on or before Monday, the 6th of April next.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
March 11, 1891.

TO IRONWORK CONTRACTORS.

THE Sheffield United Gaslight Company invite TENDERS for the supply and erection of CAST-IRON COLUMNS, and for STEEL AND WROUGHT-IRON GIRDERS for carrying the Oxide Revivifying Floor of No. 1 Purifying House (121 ft. long by 61 ft. wide) at their Neepsend Station; and for a WROUGHT-IRON ROOF over same.

Drawings and specification may be seen and form of tender with bill of quantities obtained on application to Mr. Fletcher W. Stevenson, the Company's Engineer, on payment of One Guinea, which will be returned on receipt of *bond fide* tender.

The Directors do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked "Tender for Columns, &c.," must be delivered, addressed to the undersigned, on or before Monday, the 6th of April next.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
March 11, 1891.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

TENDERS FOR SULPHURIC ACID.

THE Gas Committee invite Tenders for the supply of about 1100 tons of SULPHURIC ACID.

Forms of tender may be had on application to the Gas Engineer, Gas Offices, Bloom Street, Salford.

Sealed tenders, endorsed "Tender for Acid," and addressed to the Chairman of the Gas Committee, Town Clerk's Office, Town Hall, Salford, to be delivered not later than Three p.m. on Thursday, April 2 next.

By order,
SAML. BROWN,
Town Clerk.

Town Hall, Salford,
March 12, 1891.

LEEK IMPROVEMENT ACT, 1855.

TENDERS are invited for the following additions to the Plant at the Leek Gas-Works:—

One 6-horse power Vertical Steam-Engine.
One Rotary Exhauster to pass 20,000 cubic feet per hour.
One 8-horse power Steam-Boiler.
Two Purifiers, 13 feet by 12 feet.
One 12-inch Station Governor.
Twelve 12-inch Valves and Fittings.

Further particulars may be obtained from Mr. Norfolk, Manager at the Works, or from the undersigned.

C. HENSHAW, Clerk.

Town Hall, Leek,
March 21, 1891.

HINCKLEY LOCAL BOARD WATER-WORKS.

TENDERS are invited for the supply and delivery of about 3000 yards of LEAD SERVICE PIPING; also for about 3000 yards of GALVANIZED WROUGHT-IRON STEAM TUBING, together with other WATER-SERVICE FITTINGS, including Ferrules, Union Joints, Plugs, Stopcocks, Cock-Boxes, &c.

Forms of tender and other particulars may be obtained, on payment of One Guinea (which will be returned on receipt of a *bond fide* tender), at the Local Board Offices, Castle Street, Hinckley, after Wednesday, March 18 inst.

Forms of tender are marked as follows:—
Lead Piping only, "A."
Wrought-Iron Tubing, Ferrules, Cocks, Boxes, &c., "B."

Sealed tenders, endorsed "Water-Services," to be sent to the undersigned on or before March 31 next.

W. W. COOPER,
Surveyor to the Board.

March 13, 1891.

THE Widnes Local Board are prepared to receive TENDERS for the supply of FIRE-CLAY, RETORTS, BLOCKS, and BRICKS.

Specifications and forms of tender may be obtained from Mr. Carr, Gas-Works, Widnes.

Tenders, endorsed "Fire-Clay Goods," to be addressed to the Chairman of the Gas Committee, and delivered to the undersigned, not later than Noon on the 30th of March.

The Board do not bind themselves to accept the lowest or any tender.

JAS. T. ALLEN, Clerk.

Town Hall, Widnes,
March 13, 1891.

RADCLIFFE AND PILKINGTON GAS COMPANY.

TENDERS FOR PIPES.

THE Directors of this Company invite TENDERS for the supply of 1200 yards of 12-inch CAST-IRON GAS-MAINS.

Further particulars may be obtained on application to the undersigned, by whom tenders will be received until Friday morning, the 3rd of April next.

JAMES BRADDOCK,
Manager and Secretary.

Gas-Works, Radcliffe,
March 20, 1891.

SCARBOROUGH GAS COMPANY.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Scarborough Gas Company are prepared to receive TENDERS for the purchase of the AMMONIACAL LIQUOR AND SURPLUS TAR produced at their Works from the 18th day of April, 1891, to the 20th of June, 1892.

Conditions of tender, and necessary particulars, will be supplied on application to the undersigned, to whom tenders, in accordance with such conditions, and properly endorsed, must be delivered not later than Noon on Monday, the 6th day of April next.

The Directors do not bind themselves to accept the highest or any tender.

By order,
WILLIAM J. MOON,
Secretary and Manager.

Gas Offices, Scarborough,
March 19, 1891.

CIRENCESTER GAS COMPANY, LIMITED.

TO IRONFOUNDERS AND OTHERS.

TENDERS are invited for the Structural IRONWORK of a RETORT-HOUSE and COAL-STORE, ELEVATED CISTERN, &c.

The specifications and drawings may be seen at the Company's Office, Cirencester, and at the Office of Mr. Thomas Newbigging, C.E., 5, Norfolk Street, Manchester.

Bill of quantities and form of tender will be supplied by the latter on deposit of Two Guineas, which will be returned on a *bond fide* tender being sent in.

Tenders, endorsed "Structural Ironwork," to be sent so as to reach me not later than Noon on Friday, the 3rd of April next.

The Directors do not bind themselves to accept the lowest or any tender.

J. P. BEECHAM,
Secretary.

Gas Offices, Cirencester,
March 16, 1891.

CRAYS GAS COMPANY.

SALE BY TENDER OF 120 £10 SHARES.

IN pursuance of the Crays Gas Order, 1884, Notice is hereby given that it is the intention of the Directors of this Company TO SELL BY TENDER 120 SHARES of the nominal value of £10 each.

Forms of tender, and further particulars, may be obtained on application at the Offices of the Company.

Sealed tenders must be sent to the undersigned not later than Five o'clock in the afternoon, on Tuesday, the 7th of April, 1891.

By order,
FRANCIS M. EDWARDS,
Secretary.

Offices: The Gas-Works,
St. Mary Cray, Kent,
March 17, 1891.

EAST LONDON WATER-WORKS COMPANY.

NOTICE is hereby given, that the HALF-YEARLY ASSEMBLY of Proprietors will be held at the Company's Offices, St. Helen's Place, Bishopsgate, E.C., on Tuesday, the 7th of April, 1891, at Twelve o'clock Noon precisely, pursuant to Act of Parliament.

The Transfer Books in respect of the Ordinary Stock will be closed on the 24th of March inst., and re-opened on the 14th of April, on which day the Dividends on this Stock will be payable.

By order,
I. A. CROOKENDEN,
Secretary.

St. Helen's Place, E.C.,
March 12, 1891.

EXETER GASLIGHT AND COKE COMPANY.

EXHIBITION OF GAS-STOVES, ETC.,
APRIL 28 TO MAY 1, 1891, INCLUSIVE,
AT THE
VICTORIA HALL, EXETER.

THE Directors of the above Company invite APPLICATIONS FOR SPACE from Persons desirous of Exhibiting

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Applications, giving Maximum and Minimum Space desired, and other information as to Exhibits, to be made to the undersigned not later than the 31st of March next.

W. A. PADFIELD,
Secretary.

Gas Offices: 248, High Street, Exeter,
March 2, 1891.

Price 2s. per dozen, or 10s. 6d. per 100, post free.

CONSPIRACY and Protection of Property Act. It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of this Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

Printed copies of this Section, in large type, on broad sheets, may be obtained of WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

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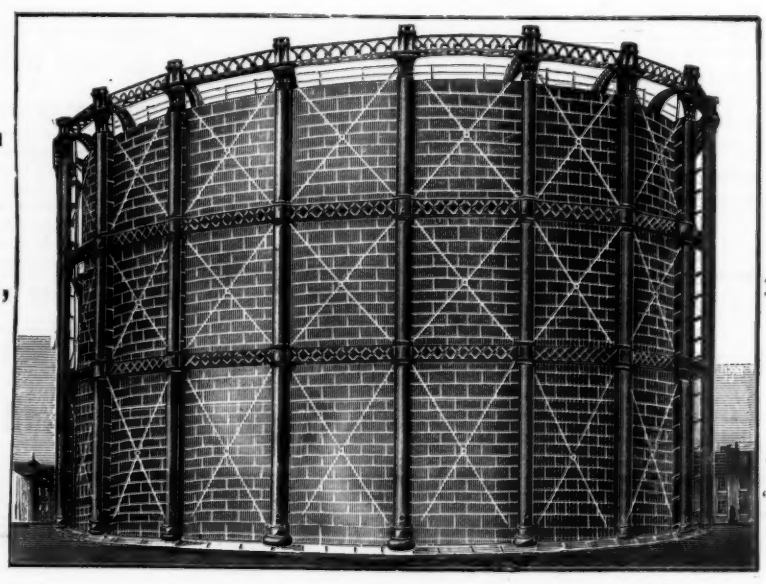

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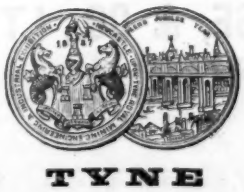

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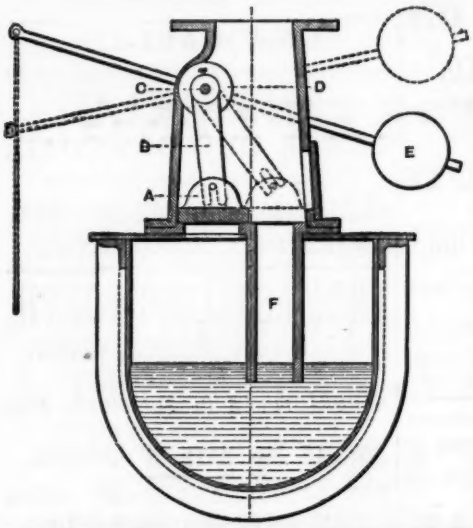

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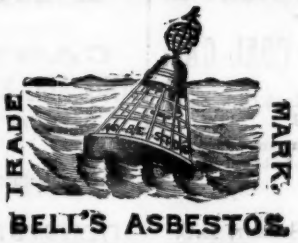

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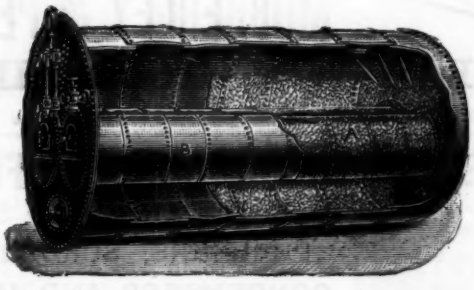
BELL'S ASBESTOS BOILER PRESERVATIVE

Will remove Incrustation from Steam-Boilers of all kinds without chipping.



A shows Boiler Plates when incrusted.
B shows Boiler Plates when cleaned by this Composition.

Every Cask is sent out as above.

The action of this **BOILER PRESERVATIVE,** by absorbing the free oxygen that is in the water, **entirely checks pitting and corrosion.** It also disintegrates incrustation so immediately as to prevent its adhering to the plates; and the deposit falls to the bottom in a loose powder, which is easily swept out. By keeping boilers clean, a **great economy of fuel is effected,** and the danger of the plates burning is entirely obviated; thus avoiding the great risks which are inseparable from scaled plates, lengthening the life of a boiler, and **covering its own cost a hundredfold.** Whenever possible it should be used through Feed Pump or Injector, which it will also keep clear from incrustation. The small quantity required to effect its purpose makes this the most economical, and more than repays the higher price we charge for a fluid which, in the case of many other makers, is useless.

QUANTITY REQUIRED A quarter of a pint weekly per horse power indicated; where the water is very bad rather more, or one pint for every 700 gallons of water evaporated.

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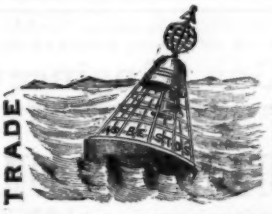
MANCHESTER: Cable St., Blackfriars.
LIVERPOOL: 2, Strand St., James St.
HULL: Humber Dock Basin.
GLASGOW: 35, Robertson Street.
DUBLIN, BERLIN.



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BARCELONA, and ANTWERP.
AGENTS.
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BRISTOL: ROBERT STOTESBURY, 114, Redcliff Street.
CARDIFF: BELL and Co., West Bute St.

SOUTHWARK, BELL'S ASBESTOS. LONDON, S.E.

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BEST LOCOMOTIVE PACKING made.

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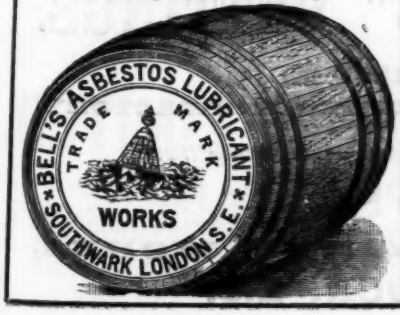
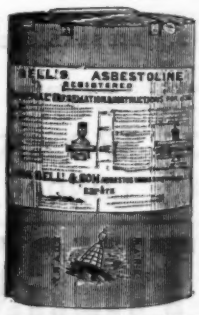
COMPOUND HYDRAULIC PACKING
Is specially suited for
Hydraulic Machinery, Accumulators and Ammonia and all Pumps.

BELL'S ASBESTOS LUBRICANT
Is unequalled
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.



BELL'S ASBESTOLINE
The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

ASBESTOLINE IS THE CHEAPEST MOST EFFICIENT, CLEANEST MOST INODOROUS AND SAFEST LUBRICANT.



ASBESTOLINE HAS SAVED 60 PER CENT. OVER OIL.

Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

BELL'S ASBESTOS
EXPANSION SHEETING
RINGS, AND TAPE.
Is the most efficient and reliable Material for Manhole, Mudhole, Steam-Pipe, and all other Joints.

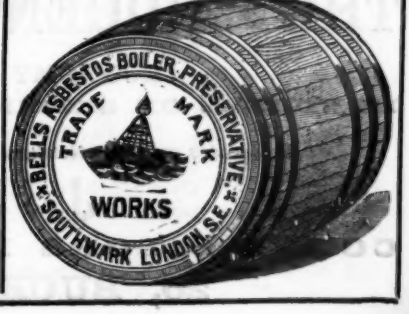
BELL'S ASBESTOS
NON-CONDUCTING COMPOSITION.

Will reduce loss by radiation and save 40 per cent. of fuel.
Is superior to any other, and saves its cost in a few months.

Can be applied again after many years' service. Is sent out dry in bags: therefore cheaper than others sent out wet.

ALL BAGS ARE MARKED AS ABOVE.

BELL'S ASBESTOS
BOILER PRESERVATIVE
Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



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The flame of the Fullford Lamp when first lighted goes immediately into action without any explosion; and after a few minutes, burns with great steadiness and brilliancy.

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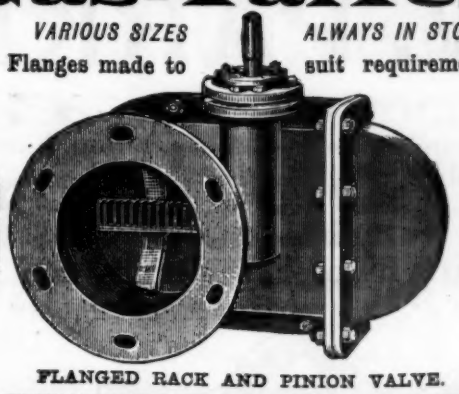

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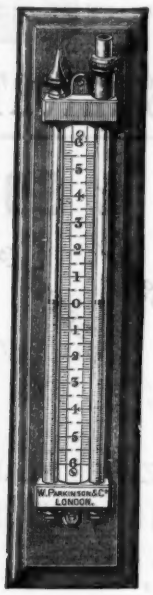
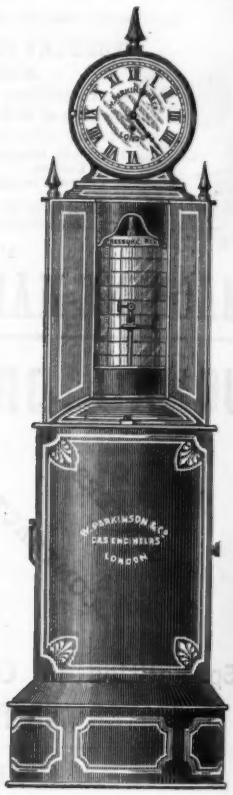
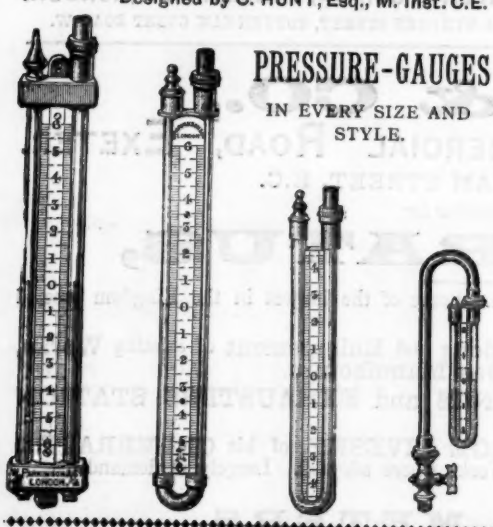




Designed by C. HUNT, Esq., M. Inst. C.E.



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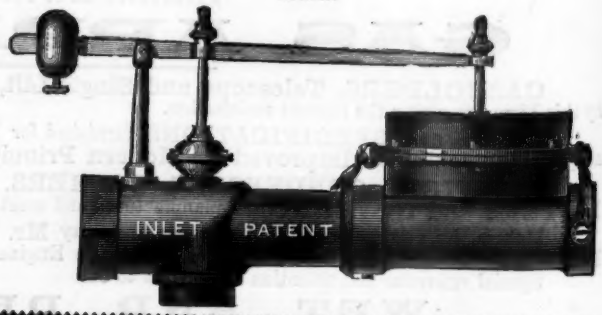

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[See also Advt., p. 538.

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